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FURTHER STUDIES ON THE SPEECH PATTERNS OF SCHIZOPHRENIC PATIENTS[1]

Measuring Inter-individual Differences in Relative Degree of Personal Disorganization and Social Alienation

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INTRODUCTION

The verbal behavior of the schizophrenic patient has been an area of special interest and attention among investigators as a source of information about the phenomenology and psychopathology of schizophrenia. Some writers have described ways in which the form and structure of language behavior are diagnostic of the schizophrenic syndrome (15–17, 19, 20). For example, the content of the patient's communications has been found difficult to understand or quite unintelligible. The language has been seen as ambiguous, with a tendency to diffusion or generalization. The words, themselves, have been noted to be used inexactly, and frequently there is frank incoherence or disjunction. Elliptical statements may occur. The sentences may have frequent self-contradictions and euphemisms, and they may contain many self-references and impersonal constructions (9, 20–22).

From the psychopathologic point of view, schizophrenic language has been noted to be concretistic and "paleologic" (1, 2) and the initial distortion in language has been described as the result of a confusion of the word symbol with the symbolized object (3) in which the usual meaning becomes ignored and the language becomes private (1, 5, 12 14).

Goodstein (6) has summarized, interpreted and attempted to integrate the various theoretical positions regarding schizophrenic language. Kasanin (13) has edited a book in which eight leading investigators of schizophrenic behavior have provided theoretical considerations on the language and thinking processes in schizophrenia, and Bellak (4) has provided an up-to-date review and discussion of the subject in his recent volume.

PURPOSE

Our attention is centered on the speech of schizophrenic patients, but not in the sense of trying to amplify further the already substantial knowledge and theoretical considerations regarding the thinking and communication disturbances in schizophrenia. Rather we are trying to exploit what is empirically known about the peculiarities of the schizophrenic mode of verbal communication for the purpose of developing a means of quantifying the relative severity of dysfunction of the schizophrenic individual. The values of such an

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aim are, broadly speaking, two-fold: 1) to work on an experimental approach to a basic and general problem in the psychological sciences, namely, the problem of developing methods of quantifying simple and complex psychologic and behavioral patterns; and 2) to take another step towards developing a useful tool in clinical psychiatric research, a means, for example, of assessing the effects of various hopefully therapeutic activities or medications on the ebb and flow of schizophrenic symptomatic manifestations occurring in the language behavior of patients.

In a previous study reported in this journal (10) we demonstrated that intra-individual variations in the degree of personal disorganization and social alienation of schizophrenic patients could be validly assessed quantitatively from a content analysis of small samples of their speech. This was accomplished through counting the frequency of use, per 100 words, of certain weighted verbal behavior items occurring in a longitudinal series of three-minute speech samples elicited at approximately weekly intervals from each of eight schizophrenic patients. The criterion measure to which the speech pattern indices of severity of disorganization and alienation were compared was the average rating of two psychiatrists, who independently rated the patients (by means of direct observation and inference) on three separate scales: interpersonal behavior, intrapsychic phenomena, and personal habits.

The present investigation was specifically designed to determine whether our verbal behavior index of relative severity of the schizophrenic syndrome, with or without modifications in the weighting of the various verbal categories, might be valid in assessing differences, cross-sectionally, between schizophrenic patients in the relative severity of disorganization and alienation. That is, we wanted to find out whether our method of measurement was capable of discriminating inter-individual differences as well as intra-individual variations.

PROCEDURE

We first undertook a pilot study, using fourteen schizophrenic patients (seven males and seven females) from the psychiatric wards of the Cincinnati General Hospital. Five-minute verbal samples were elicited by one of us (T. D.), employing the standardized instructions[3] described in other publications (7, 8, 9, 11). The verbal samples were recorded on a tape recorder (in full view of the patient) and transcribed by a secretary. Another investigator (L. A. G.) independently rated the severity of the schizophrenic illness, as adjudged from clinical observations of the patient on the day the patient gave the experimental verbal sample; these evaluations were made in terms of the same three scales used in the longitudinal study (10). The fourteen verbal samples were scored (by T. D.) according to the verbal behavior analysis schedule with original weightings as outlined in Table 1. The rank-order correlation of the verbal behavior measure and the clinical criterion measure was .55, significant beyond the .05 level (one-tail test). This encouraging concordance led us to undertake a more extensive and definitive investigation.

A five-minute verbal sample, elicited in

[3] The specific instructions used to elicit speech in the investigation being reported here were exactly the same as those used in other studies cited in the above reference but differed slightly from those used in our longitudinal study of schizophrenic speech patterns (10). In the latter the patient was asked to speak anything which came to mind into a recording telephone for three minutes instead of five minutes. The instructions used in the present study were: "This is a study of speaking and conversational habits. Upon a signal from me I would like you to speak for five minutes about any interesting or dramatic life experiences you have had. Once you have started, I shall be here listening to you, but I would prefer not to reply to any questions you may feel like asking me until the five minutes are up. Do you have any questions you would like to ask me now before we start? Well, then, you may start."

TABLE 1

Verbal Analysis System for Rating Severity of Schizophrenic Disorganization and Social Alienation

Scores (Weights)		Categories and scoring symbols
Modified	Original	
		I. Interpersonal references (including fauna and flora)
		A. To thoughts, feelings or reported actions of avoidance, leaving, deserting, spurning, not understanding of others
0	−1	1. self avoiding others
+1	−1	2. others avoiding self
		B. To unfriendly, hostile, destructive thoughts, feelings or actions
+1	−1	1. self unfriendly to others
+⅓	−1	2. others unfriendly to self
		C. To congenial and constructive thoughts, feelings or actions
−2	+1	1. others helping, being friendly towards others
−2	+1	2. self helping, being friendly towards others
−2	+1	3. others helping, being friendly towards self
		D. To others (including fauna, flora, things, and places)
0	−1	1. bad, dangerous, low value or worth, strange, ill, malfunctioning
0	+½	2. intact, satisfied, healthy, well
		II. Intrapersonal references
		A. To disorientation—orientation, past, present or future. (Do not include all references to time, place, or person, but only those in which it is reasonably clear the subject is trying to orient himself or is expressing disorientation with respect to these. Also, do not score more than one item per clause under this category.)
+2	−1	1. indicating disorientation for time, place, person or other distortion of reality
0	+½	2. indicating orientation in time, place, person
0	−½	3. indicating attempts to identify time, place or person without clearly revealing orientation or disorientation
		B. To self
+1	−1	1. injured, ailing, deprived, malfunctioning, getting worse, bad, dangerous, low value or worth, strange
−2	+½	2. getting better
−1	+1	3. intact, satisfied, healthy, well
+½	−½	4. not being prepared or able to produce, perform, act, not knowing, not sure
+½	−1	5. to being controlled, feeling controlled, wanting control, asking for control or permission, being obliged or having to do, think or experience something
+3	−½	C. Denial of feelings, attitudes, or mental state of the self
		D. To food
0	−1	1. bad, dangerous, unpleasant, or otherwise negative; interferences or delays in eating; too much and wish to have less; too little and wish to have more
0	+½	2. good or neutral
		E. To weather
0	+½*	1. bad, dangerous, unpleasant or otherwise negative (not sunny, not clear, uncomfortable, etc.)
0	+1	2. good, pleasant or neutral
		F. To sleep
0	−1	1. bad, dangerous, unpleasant, or otherwise negative; too much; too little
0	+½	2. good, pleasant or neutral

TABLE 1—*Continued*

Scores (Weights)		Categories and scoring symbols
Modified	Original	
		III. Miscellaneous
		A. Signs of disorganization
+1	−1	1. remarks or words that are not understandable or inaudible
0	−1	2. incomplete sentences, clauses, phrases; blocking
+2	−1	3. obviously erroneous or fallacious remarks or conclusions; illogical or bizarre statements
		B. Repetition of ideas in sequence
0	−½	1. words separated only by a word or phrase (excluding instances due to grammatical and syntactical convention, where words are repeated, *e.g.*, "as far as," "by and by," and so forth. Also, excluding instances where such words as "I" and "the" are separated by a word.)
+1	−1	2. phrases, clauses (separated only by a phrase or clause)
		New Items
+1	0	IV. A. Questions directed to the interviewer
0	0	B. Other references to the interviewer
+1	0	V. Religious and biblical references

* Scored +½ for the first two in a verbal sample and thereafter this item is scored −1. *Rules for Scoring the Categories:* (See our previous publication ((10)) for a list of these rules.

the same way as those in the pilot study, was obtained from each of 152 patients, 28 males and 124 females, from Longview State Hospital. Clinical ratings were again made on the three 10-point scales (interpersonal, intrapsychic, personal habits) described in the longitudinal study (10), and the sum of these ratings constituted the criterion-measure in the present study. The ratings were written down just before the verbal sample was obtained, the judgments being based on direct clinical observations and notes from nurses and attendants, over a two to three-day time-span preceding the moment of giving the verbal sample. Once these ratings were written down, they were not changed, regardless of what the patient did when he was presented with the instructions to speak. The verbal samples were, again, recorded on a tape recorder in full view and transcribed. The typed speech samples were scored by one investigator and checked by another according to the schizophrenic disorganization and social alienation scales of the previous study (10). (See also Table 1.) Three new thematic items were also scored because they were considered as having possible relevance to the schizophrenic syndrome (Table 1), but tentative weights were not initially assigned to them. Nor were they included in the total score.

Our total sample of schizophrenic patients was randomly split into two groups of equal size for purposes of cross-validation.

Some remarks about the system of scoring a verbal sample are necessary here. A category was scored by a code symbol each time it occurred in a unit of communication. A communication unit was arbitrarily defined as a clause, *i.e.*, the combination of a subject and predicate, for this seemed to be the smallest verbal unit, except for interjections, that conveyed information about objects, thoughts, feelings and actions. A list of rules for scoring the verbal items is given at the end of Table 1, which also gives the items and their weights.

An example follows of a fragment of two five-minute verbal samples actually produced by two of our patients: the examples illustrate our system of scoring those clauses which have scoreable items, with appropriate symbols designating each category. Underlined words indicate repetitions; unintelligible or inaudible words are indicated in brackets. (See Table 1 for key to scoring symbols.)

Part of Verbal Sample by G. C.

III B_2
In the morning I clean my teeth, / clean
III B_2
my gums and all that, / clean my teeth and
III A_1
tongue and all that / (2 words) said that. /
II D_2
Spoke about it upstairs. / And after I eat
II D_1
breakfast / all that white scum comes on
II B_4
'em again. / I don't know what from. / I
II B_4 II B_1
don't know whether / it's from fermenting
III A_1 II B_1
from my ear, / but I got a stone in it out
II B_1 II B_1
here. / Never was removed, / whether it's
II B_1
from that or what. / Looks awful bad. /
II B_1
I'm ashamed to show it to anybody. / The
III A_1 I A_2
funniest rays (3 words) / but I been losing
III A_1
friends by it. / These rays (3 words) / in-
I B_2
criminating against them / and they inno-
II B_4
cent people. / I don't know / why that is. /
II B_4 III B_2
I can't understand / why that is either, at
III A_1 I D_1
all. / Don't (2 words) / it breaks right
III A_3
through my body or my system like. / Been
I A_2 III A_3 II B_4
losing friends by it. / Don't know why it is. /
II B_1 III B_2
My lips are always real dry like, real dry. /
I D_2
Months now. / My folks are all good people
II B_4 III A_1
too. / I can't understand / (3 words) /
I D_2 II B_1
They good. / When my health failed, / why
I C_3
then my folks asked for me not to do any
work ....

Part of Verbal Sample by R. W.

When I was in the army / we had a gas uh
IV A
drill. / And uh they uh used / uh what was
I B_2 III B_2
that / poison gas various types of poison
gas on us. / And uh one of them (they used)
III B_1
was Firegene / and, boy, we coughed and
III B_2
coughed and coughed underneath it. / And
II B_1 I B_2
uh we, it took me five minutes to recover
II B_5
from it. / We also had to go through the
III B_1
gas chamber in the army / and uh and they
IV A
told me / that the uh uh / what's the name
III B_1 I D_1
of that gas uh tear gas? / would affect you
II B_1 II C
bad. / But I it never affected me. / But the
II B_1 III B_1
uh chlorine affected me. / I I got in that
II B_1 II B_1
gas chamber. / I coughed again / just like
III A_3 IV B
the Firegene did. / I'll tell you about my
army experiences ....

Since shorter verbal samples supply less information and consequently are less reliable representatives of an individual than longer ones, we decided that only samples of 45 words or more would be included in the validation study. Those persons speaking fewer than 45 words were classified as "reti-

TABLE 2

Background Data for the Total Sample of Schizophrenic Patients

Race	Sex	N	Diagnosis						Age (in years)		Education (in years)		Rating		Correlations	
			Undiff. Schiz.	Simple Schiz.	Catatonic Schiz.	Hebephrenic Schiz.	Paranoid Schiz.	Schizo-Affective	Mean	S.D.	Mean	S.D.	Mean	S.D.	Educ. by Rating	Age by Rating
W	F	101	39	7	3	10	39	3	48.3	13.4	9.1	2.7	15.7	8.5	−0.06	0.18
N	F	23	4	1	1	2	13	2	40.5	9.6	7.9	3.2	15.5	9.8	−0.28	0.45*
W	M	22	11	1	1	4	5	0	38.4	11.2	8.9	2.9	13.0	7.7	−0.32	0.26
N	M	6	3	0	1	0	2	0	36.3	9.9	8.3	3.0	17.3	6.7	−0.12	0.41
		152	57	9	6	16	59	5	42.2	13.2	8.8	2.9	15.3	8.5	−0.14	0.23*

* Significant at .05 level.

cent." There were 39 such individuals and these patients were split between the two subgroups.

All the relevant vital statistics of each patient, as age, sex, type of schizophrenia, duration of illness, the criterion measure of severity of schizophrenic syndrome, and breakdowns of the percentage frequency of occurrence of each category of thematic reference were entered on I.B.M. cards for processing. Means, standard deviation, and Pearson product-moment correlations among the verbal categories and criterion ratings were obtained for each subsample separately by means of the I.B.M. 650 digital computer.

RESULTS

In Table 2 are provided some background data on the total group with regard to race, sex, age, education, and diagnostic categories. It may be noted that the majority of the schizophrenic patients were white females, and as a group these were significantly older than any of the other subgroups classified by race and sex. No significant differences were found in average education or psychiatric rating (*i.e.*, severity of schizophrenic syndrome) for subgroups classified by race and sex. Age and severity of the schizophrenic syndrome were found to be correlated to a small but significant degree, probably reflecting the fact that among our patients there was a nucleus of older patients who have remained ill for a long period of time or even regressed despite all attempts at treatment. (The great majority of patients were on some type of psychoactive medication.)

The composition of the two subsamples is shown in Table 3. The two samples did not differ significantly with regard to distribution of race, sex, age, education, or psychiatric rating. They did differ somewhat, however, in distribution of diagnostic categories, with a significantly greater proportion of undifferentiated schizophrenics in Subgroup I and a greater proportion of paranoid schizophrenics in Subgroup II.

Using only those verbal samples containing 45 words or more, the complete matrix of intercorrelations among the three criterion scales, and the percentage frequency scores derived in each speech category were obtained for each subgroup separately. A portion of these results is shown in Table 4. For both groups the total verbal behavior score predicted each of the criterion rating scales and the combined criterion rating at or beyond the .001 level of significance. The correlation with the total criterion rating was .53 in Subgroup I and .60 in Subgroup II. It thus appeared well established that our verbal behavior scale could validly discriminate differences in severity of illness between individuals as well as within an individual.

A detailed scrutiny of Table 4 reveals that

TABLE 3

Composition of Each Subgroup of Schizophrenic Patients

Race	Sex	N	Diagnosis						Age		Education		Rating	
			Undiff.	Simple	Catatonic	Hebephrenic	Paranoid	Schizoaffective	Mean	S.D.	Mean	S.D.	Mean	S.D.
Subgroup I														
W	F	50	24	5	2	4	14	1	49.4	14.1	9.2	3.2	15.9	8.8
N	F	13	2	1	1	2	5	2	39.6	7.0	8.8	3.6	16.8	9.0
W	M	8	6	0	0	1	1	0	43.1	10.2	8.6	3.6	12.4	6.4
N	M	5	3	0	1	0	1	0	34.0	9.2	9.2	2.8	18.8	6.4
Total		76	35	6	4	7	21	3	46.1	13.4	9.0	3.3	15.8	8.6
Reticent		20	11	2	4	1	2	0	49.2	15.0	8.2	3.0	21.0	7.8
Non-Reticent		56	24	4	0	6	19	3	45.0	12.7	9.4	3.3	14.0	8.1
Subgroup II														
W	F	51	15	2	1	6	25	2	47.2	12.6	9.0	2.2	15.5	7.9
N	F	10	2	0	0	0	8	0	41.6	12.0	6.9	2.4	13.8	10.5
W	M	14	5	1	1	3	4	0	35.6	10.8	9.0	2.3	13.4	8.3
N	M	1	0	0	0	0	1	0	48.0	0.0	4.0	0.0	10.0	0.0
Total		76	22	3	2	9	38	2	44.2	12.9	8.6	2.4	15.0	8.4
Reticent		19	4	1	0	6	8	0	46.3	10.1	7.9	2.7	22.0	6.7
Non-Reticent		57	18	2	2	3	30	2	43.6	13.6	8.9	2.3	12.4	7.7

certain categories were much more highly and consistently related to the criterion measure than others. In particular, mumbled and inaudible phrases (III A_1), illogical or bizarre remarks (III A_3) and repetitions of phases or clauses (III B_2) were consistently positively correlated with the criterion ratings, while the category for references to people helping, being friendly to others or self, and self being friendly to others (I $C_{1,2,3}$) was very significantly negatively correlated with ratings in both samples. On the other hand, categories such as references to food as pleasant or unpleasant (II D_1 and II D_2), references to weather (II E_1 and II E_2), to sleep (II F_1, II F_2) abrupt shifts of thought (III A_2), and repetition of single words (III B_1) were not found to be contributing to the predictions in either sample. (References to weather and to sleep occurred so infrequently in this cross-sectional study that they were not included in the correlational analysis.)

It was, therefore, decided to attempt to refine the weighting of categories in the verbal scale by making weights more nearly proportional to the independent contribution of each category to overall prediction. This involved taking into account the standard deviation of category scores and their intercorrelations as well as their validities. Those items which made no contribution to prediction in either sample were given zero weight, as were also two items regarding orientation and attempts at orientation (II A_2, II A_3), which, although apparently possessing some validity, were found to be difficult to score unless other data were available by which to judge the correctness of the statements made. Weights were assigned to two of the three new categories: questions directed to the interviewer (IV A); and religious and biblical references (V). In general, new weights were chosen to increase the correlation with the combined criterion rating in Subgroup I, but certain restrictions were imposed in assigning these weights with the hope of also increasing the stability of the correlation from one subgroup to another, rather than seeking to maximize

TABLE 4

Correlations between the Three Criterion Measures and Each Speech Category for Subgroups I and II

Criterion Measures	Interpersonal Relations		Intrapsychic Phenomena		Personal Habit Patterns		Total Rating		Mean		Standard Deviation	
	I	II	I	II	I	II	I	II	I	II	I	II
Interpersonal Relations			0.79	0.65	0.66	0.51	0.92	0.84	5.70	4.88	2.86	2.87
Intrapsychic Phenomena	0.79	0.65			0.59	0.67	0.92	0.92	5.43	5.00	3.75	3.53
Personal Habit Patterns	0.66	0.51	0.59	0.67			0.81	0.82	2.88	2.56	2.48	2.53
Total Ratings	0.92	0.84	0.92	0.92	0.81	0.82			14.00	12.44	8.11	7.72
Speech Categories												
I A	0.09	0	0.11	−0.03[a]	−0.15[a]	−0.19[a]	0.04	−0.08[a]	0.32	0.27	0.70	0.44
I B	0.04	0.08	0.08	0.04	0.16	−0.04[a]	0.10	0.04	.50	0.36	1.00	0.78
I $C_{1,2,3}$	−0.30**	−0.45***	−0.29*	−0.35**	−0.39**	−0.27*	−0.36**	−0.41**	1.00	1.20	0.86	1.10
I D_1	0.14	0.01	0.11	−0.14[a]	0.19	−0.12[a]	0.16	−0.08[a]	0.64	0.86	0.81	1.42
I D_2	−0.03	−0.31*	0.01	−0.42**	0.05[a]	−0.34**	0.01	−0.42**	0.28	0.41	0.61	0.53
II A_1	0.11	0.19	0.27*	0.24*	0.20	0.15	0.22*	0.23*	0.09	0.06	0.37	0.34
II A_2	−0.16	−0.14	−0.04	0.07[a]	0.31*	−0.14	−0.17	−0.07	0.08	0.06	0.20	0.15
II A_3	0.28*	0.15	0.25*	0.15	0.22	0.11	0.28*	0.16	0.31	0.16	0.48	0.37
II B_1	0.02	0.13	0.07	0.08	0.13	0.02	0.08	0.09	1.44	1.48	1.74	1.49
II B_2	−0.11	−0.07	−0.16	−0.05	−0.28*	−0.18	−0.20	−0.11	0.16	0.08	0.26	0.19
II B_3	−0.23*	−0.20	−0.20	−0.13	−0.04	−0.12	−0.19	−0.17	0.70	0.85	1.06	1.05
II B_4	0.07	0.37**	−0.01	0.31*	0.02	0.38**	0.03	0.40**	1.52	1.54	1.92	2.45
II B_5	−0.07[a]	0.19	0.03	0.35**	−0.14[a]	0.19	−0.05[a]	0.29*	0.47	0.41	0.56	0.79
II C	0.03	−0.01	0.20	0	0.19	−0.04*	0.16	−0.01	0.13	0.08	0.22	0.17
II D_1	0	−0.15[a]	−0.06[a]	−0.18[a]	0.03	−0.20[a]	−0.02[a]	−0.20[a]	0.07	0.02	0.28	0.09
II D_2	0.08[a]	−0.03	−0.04	0.07[a]	0.09[a]	0.21[a]	0.04[a]	0.09[a]	0.20	0.07	0.73	0.24
III A_1	0.29*	0.33**	0.33**	0.51***	0.36**	0.35**	0.36**	0.47***	1.17	0.98	2.14	2.10
III A_2	0.04	−0.09[a]	0.03	0.17	0.08	0.03	0.05	0.05	0.55	0.26	0.57	0.35
III A_3	0.30*	0.25	0.40**	0.42**	0.32**	0.38**	0.39**	0.41**	0.82	0.31	1.06	0.61
III B_1	−0.06[a]	−0.01	−0.14[a]	0.18	0.14	−0.08[a]	−0.04[a]	0.06	1.27	0.81	1.40	0.94
III B_2	0.15	0.31*	−0.03[a]	0.38**	0.33**	0.46***	0.14	0.44***	1.71	1.77	1.80	1.82
IV A	0.08	0.30*	0.05	0.45***	0.26*	0.34**	0.13	0.43***	0.66	0.63	1.44	1.00
IV B	−0.08[a]	0.08	−0.10[a]	0.31*	−0.01	0.16	−0.08[a]	0.23*	0.61	0.60	0.89	0.95
V	0.06	0.02	0.08	0.25*	−0.15[a]	0.06	0.01	0.14	0.29	0.19	0.90	0.69
Total	0.45***	0.53***	0.43***	0.58***	0.59***	0.44***	0.53***	0.60***	7.19	6.44	4.76	6.05

* Significant at .05 level.
** Significant at .01 level.
*** Significant at .001 level.
[a] Reversal from direction of expected correlation.

TABLE 5

Correlations of the Revised Verbal Behavior Index Criterion Scales (Using the "Modified Weightings" Given in Table 1)

Criterion Scales	Subgroup I	Subgroup II	Total
Interpersonal	0.48	0.56	0.53
Mental Status	0.45	0.64	9.54
Personal Habits	0.60	0.54	0.57
Total	0.58	0.68	0.63
Verbal Behavior Index			
Mean	5.96	4.06	5.00
S.D.	6.21	7.20	6.79

the correlation in any one subgroup. The new weights developed from patients in Subgroup I were cross-validated on Subgroup II. The final language category weights are shown in Table 1 as "modified weightings."

The verbal behavior scores resulting, when the "modified" weights were used, correlated .58 in Subgroup I and .68 in Subgroup II with the total criterion measure, yielding an over all correlation for the total group of schizophrenic patients of .63. A more detailed analysis of the correlations is given in Table 5. All correlations in both subgroups were increased slightly by the revision, and for the total group of schizophrenic patients each of the rating scales was predicted with about equal efficiency.[4]

RETICENT PATIENTS

As noted previously, 39 of the 152 subjects spoke less than 45 words in the five-minute period and consequently were not used in the analysis of verbal productions. Sixteen of this group were completely mute, while the others spoke from five to 44 words. An examination of the diagnoses of these patients revealed that there was a greater proportion of simple, catatonic and hebephrenic patients and a smaller proportion of paranoid schizophrenic patients in this group than in the non-reticent group. When we divided the total group into those who spoke less than 100 words (58) and those who spoke 100 or more words (94), the trend for paranoid schizophrenic patients to speak more words under our experimental conditions than other schizophrenic types still persisted and was significant beyond the .01 level.

The reticent group as a whole were rated as much sicker by the psychiatrist. They had an average rating on our clinical rating scale of 21.5 as compared to 13.2 for the non-reticent group, a difference which is significant beyond the .001 level. For the 16 who did not speak at all the average rating was 25.4 (highest possible rating 30); whereas, for the remaining 23 the average was 18.8. It seems reasonable to conclude, therefore, that a schizophrenic who speaks less than 45 words under the circumstances of this verbal test, and particularly one who is completely mute, is extremely deviant in a pathological direction with respect to our clinical ratings of severity of the schizophrenic syndrome.

An examination of the productions of those who were reticent but not mute, however, revealed one exception to this conclusion. There were four patients in Subgroup I and two in Subgroup II who simply made a statement to the effect that they had nothing to talk about and then said no more for the entire period. From the psychiatrist's ratings it would appear that such patients are not necessarily very sick; in fact, their average rating was 9.0, the ratings ranging from 2 to 22. The statement made by the one rated as 2 was, "I don't know anything

[4] The equation for predicting our total clinical rating from the verbal score is $R = 0.7\,V + 9.7$, where R = Total Clinical Rating and V = Verbal Behavior Score.

It should be noted that the modified weightings are arranged so that plus weightings signify the more severe schizophrenic syndrome, in contrast to the original weightings in which pluses signify the more healthy responses. The distribution of scores obtained with the modified weights is somewhat skewed to the right and possibly could profit by a mathematical transformation to obtain a more symmetrical distribution.

to talk about." That made by the one rated 22 was, "Yeah, but I don't know anything I could say."

DISCUSSION AND CONCLUSIONS

This study provides evidence that the severity of the schizophrenic illness can be quantitatively assessed at any one time in different schizophrenic patients by a weighted scoring of certain speech categories in five minute samples of speech elicited with standardized instructions. The study also indicates that in those instances where the schizophrenic patient responds with silence or relatively few words under the conditions of the verbal test used here, an approximate score of severity can be arrived at which is highly predictive of his total behavior. Only when the patient makes the statement that he has nothing to talk about and then says nothing more is it uncertain whether the patient is very sick or relatively well. We have no interpretation to offer on this last point. Only six of our total group of 152 patients fell into this classification, and this obviously does not provide a large enough number of persons to examine for a more definitive interpretation.

Other investigators have examined the problem of lack of responsiveness or cooperation of some schizophrenic patients to diagnostic testing procedures and have raised the pertinent question whether these uncooperative patients are a population that are qualitatively different from the testable population of schizophrenics. It is not surprising that clinical psychologists have found varying percentages of untestability among schizophrenics, depending on the testing conditions and testing tasks. Zubin *et al.* (24), for example, noted 25 per cent of the chronic schizophrenics used in the Columbia-Greystone project were untestable on more than one third of a test battery including cognitive (IQ), perceptual, and motor tasks. Mednick and Lindsley (18), studying a very chronic sample of patients (median length of hospitalization: 16 years), reported that 55 per cent were untestable on a test battery consisting of the Wechsler-Bellevue and Rorschach. Wilensky and Solomon (23) reported 27 per cent of a group of 101 chronic male schizophrenics (median length of hospitalization: 10 years) were untestable when a Rorschach and an abbreviated Wechsler-Bellevue were administered. The latter investigators also noted that the untestable group had the poorest mental health ratings, particularly those who were "confused," that is, who seemed willing but unable to produce scorable records, as compared to those who "refused," that is, who appeared able but unwilling to perform.

Although 26 per cent (39 of our 152 patients) spoke less than 45 words in the five minute period (and we did not score these specific verbal samples because we had set this level of production as an arbitrary cut-off point) we would not label this group of 39 patients as constituting our "untestable" group. The primary purpose of administering the verbal behavior test that we have been describing herein was to assess the relative severity of the schizophrenic symptom-complex, and we have been able to demonstrate a validated index of severity was actually provided by a patient's speaking less than 45 words or not speaking at all. As far as we now know, poor predictive capacity regarding clinical psychotic behavior of our schizophrenic verbal measure, and hence in a sense "untestability," occurred only in the four per cent of our population we have specifically described above, who said that they have nothing to talk about and then said no more.

We have provided, in Table 1, two sets of weights—the "original" weights of the longitudinal study and the "modified" weights of the present cross-sectional study. We have some tentative suggestions as to which set of weights may be best to use for different types of clinical psychiatric research problems. The "modified" weights have been shown to be superior in cross-sectional studies where information is desired as to the

relative severity of the schizophrenic syndrome on the day of testing as adjudged from a single five-minute verbal sample. If a more general index of the severity of illness is required, which ignores daily fluctuations, our experience with other indices of behavior derived from verbal samples leads us to believe that a mean or median score should be obtained from several verbal samples (11). We have noted, however, that when patients are requested to talk at daily or even weekly intervals in response to the instructions used in deriving this measure of severity of symptom-complex, they tend to use more content categories (for example, references to weather, sleep, food, etc.) in subsequent verbalizations than they do when given the instructions for the first time. In this language behavior, they resemble the communication activity of the patients used in our longitudinal study on whom the "original" weights were developed. It is possible, therefore, that the original (non-zero) weightings for these items would result in more accurate discrimination whenever repetitive measures of severity are to be made.

We have checked back and tried recalculating the schizophrenic severity indices on the last three patients of our longitudinal study using the "modified" weights arrived at from the present, cross-sectional study. For these three patients the revised scores are as highly correlated with the criterion measure as were the scores based on the original weights. (See Table 6.) Thus, it may well be that the "modified" weights are applicable not only to cross-sectional studies, but also to longitudinal ones. If so they would have the advantage of greater simplicity, since fewer items need to be scored. However, further studies are needed using the present instructions for eliciting verbal productions, before definite conclusions can be drawn.

An additional question in which we are interested is whether this verbal behavior scoring system of schizophrenic speech might be, in fact, dealing with speech habits and

TABLE 6

Comparisons of Correlations Obtained by Using Original Weights (On Last Three Patients Followed Longitudinally) With Correlations Obtained by Using Modified Weights Derived from Present Cross-Sectional Study

Patient	Number of Samples	Rank Order Correlations with Criterion Scales	
		Using Original Item-weighting	Using Modified Item-weighting
6	11	0.58*	0.65*
7	15	0.44*	0.48*
8	14	0.80†	0.88†

* Significant at .05 level (one-tailed test)
† Significant at .001 level (one-tailed test)

symbolic activities which are not unique to the person with a schizophrenic syndrome but to varying extents are ubiquitous in mankind. Perhaps the aspects of language behavior on which we are concentrating our attention in these studies of schizophrenic speech patterns are not all pathognomonic for the schizophrenic syndrome. We are quite aware that other ill people, mentally and physically (and also functioning and healthy, communicative people) tend to withdraw and become disorganized to various degrees at times. It is apparent that people who are not schizophrenic fluctuate in the intensity of their feelings of alienation and closeness, in their coherency and articulateness. Perhaps only some of the speech categories we are scoring here are diagnostic of the schizophrenic syndrome, and other verbal behavior items we are scoring may occur secondarily in reaction to any illness, medical as well as psychiatric. To answer these questions fully, we are carrying out further studies in which the verbal scores from our group of schizophrenic patients will be compared to other hospitalized patients, psychiatric but non-schizophrenic, medical and surgical, and non-hospitalized "normals." These studies will provide us with information about the distribution of scores in various populations and will help us to determine not only the form of scaling

that will be most useful, but also will give us information as to the value of our method of verbal behavior analysis for clinical differential diagnosis.

At this point we can state definitely that our verbal behavior measure is a valid indicator of the relative severity of the schizophrenic syndrome from patient to patient as well as of the fluctuations of severity within a patient. As such, our schizophrenic scale can be used as a means of measuring the spontaneous fluctuations in severity and the changes in severity of this symptom-complex under various therapeutic regimens.

SUMMARY

A pilot study was first done on 14 schizophrenic patients to test the capacity of a verbal behavior analysis procedure to discriminate accurately among individuals as to the severity of the schizophrenic syndrome—specifically the degree of social alienation and personal disorganization—as compared to a clinical criterion measure. The rank-order correlation of the verbal behavior measure and the criterion measure was 0.55, significant at the .05 level (one-tail test).

Thereupon, verbal samples were obtained from and scored on 152 chronic schizophrenic patients. This group was randomly split into two groups of equal size for purposes of cross validation. The total verbal behavior indices calculated from those verbal samples, containing 45 words or more, predicted each of three criterion rating scales and the combined criterion measure at or beyond the 0.001 level of significance. The correlation with the total criterion rating was 0.53 in Subgroup I and 0.60 in Subgroup II.

Thirty-nine of the 152 schizophrenic patients spoke less than 45 words in response to the verbal test instructions, and these verbal samples were not included in the above correlation, for they were assumed to be minimally representative of the individuals in terms of content. However, such reticent patients were rated on the clinical criterion measure and were found, as a group, to be much sicker than the non-reticent group. They had an average rating of 21.5 as compared to 13.2 for the non-reticent group, a difference which is significant at the .001 level. Paucity or lack of speech under our test conditions, then, also provides a validated measure of severity of illness.

The weighting of categories in our verbal scale was refined by making the weights more nearly proportional to the independent contribution of each category to the prediction of severity of schizophrenic syndrome.

The possible application to psychiatric research of this verbal behavior measure of severity of schizophrenic syndrome is suggested.

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CONCEPTUAL PROBLEMS IN SCHIZOPHRENIA

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When, in 1890, Kraepelin assigned to a group of mental disorders the name Dementia Praecox, he based this on their common termination in a state of deteriorated intellectual functioning. The abnormal behavior and disturbed symbolic processes, including speech, of patients with this illness appeared to demonstrate a tendency to randomness and incoherence. In 1911, Bleuler drew attention to the motivational and affective significance of the characteristic secondary symptomatology of this disease group, and proposed the term schizophrenia. He maintained, however, that the primary process, a loosening of the associative processes, was on a somatic basis. Other psychiatrists, who pursue a psychodynamic approach to schizophrenia, have focussed primarily on the importance of disturbing events in the early life of their patients. Little attention has been paid to the possible ways in which early emotional disturbances can systematically distort the child's conceptual and symbolic organization of his experience.

In 1956 Bateson and his co-workers (1) proposed a systematic model for the confused thinking of the schizophrenic, based on the theory of logical types of Bertrand Russell, and on communication theory. According to these investigators the schizophrenic is subjected as a child to communications which have multiple and contradictory meanings. In consequence, the schizophrenic is unable to distinguish the level of significance of statements made to him and therefore is confused, and confusing, in his responses. Valuable as this theory is in its attempt to associate early influences with the later disorder in thinking, it does not take into account the changing conceptual forms available to the child for structuring these confusing messages and his perceptions, including those originating within himself.

These conceptual or symbolic structures, and the sequence in which they mature in the child, have been studied and described in detail by Piaget (4, 5). Between eighteen months and two years the child becomes able to manipulate symbols for objects and for relations between objects, as well as objects themselves. The relationships through which he organizes his conceptions of these objects have been found to have the properties of relationships in topological space. These are the properties of figures which are conserved through any deformation which maintains the singleness of the figure, namely relationships of closeness and distance, separation, sequence, continuity and enclosure. These relationships permit the child to recognize objects in his sensory field without an understanding of perspective and geometry.

The construction of objects by the child, related to their parts and to each other in topological space, necessarily precedes the development and comprehension of higher-order relationships in time, number, cause and logic, and of emotional relationships between people as well. Before the higher-order relationships become useful to him, the child must solve certain basic problems in the construction of entities in space. He must, first, separate the sensations arising within his body from those arising outside. As Kubie (3) pointed out, he learns that there are groupings of sensations which are preserved despite their various displacements in his

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perceptual field. He learns to regard his own body as one of these groupings.

An essential aspect of this development of the concept of the body is the identification which the child must make between his bodily urges, on the one hand, and his viewing "self," on the other. He learns to think of body and self as occupying the same space and forming a single functional unit, separate from the units around him and able to act on them to cause his needs to be satisfied. This development requires consistent support and confirmation from the environment.

If, as in the case of the schizophrenic patient, this confirmation is missing or inaccurate, then the child will experience emotional disturbances as distortions in the spatial configuration of his self-body concept, and these distortions will be intensified by subsequent disappointments. The well-known symptoms, like distortions of body image, defects of ego boundary and consequent difficulties in interpersonal relationships are manifestations of this phenomenon in schizophrenics.

We would like to present some data from the language of adult schizophrenic patients, recorded at a time when they appeared rational and coherent, which we believe show that this disturbance may manifest itself, beneath the surface, in their thinking and verbal expressions. The data are taken from a number of tape recordings, originally made for another study,[3] of thirty-minute samples of the speech of schizophrenics. Each patient in the study was seated opposite an interviewer but separated from him by a screen and told to speak on certain topics relating to his personal history. If he were silent for 15 seconds he was prompted by a neutral statement from the interviewer. About three-fourths of the patients interviewed in this way were able to continue speaking for the full 30 minutes. The tapes were reviewed, and four that seemed most suggestive on casual listening were transcribed and analyzed closely.

Through most of these speech samples we observed either unremarkable language or features previously associated by Lorenz (3) with hysterical and obsessive symptomatology. However, in each sample, in 12 to 16 instances, we observed clusters of expressions for relationships in topological space.

In ordinary language these expressions are quite common. Because spatial concepts serve as models for higher-order relationships we ordinarily use them for the representation of more complex conceptions, together with more specific higher-order terms. For instance, we speak specifically of a moment in time or a period of time, but we also speak of a point in time or a length of time. In the area of emotions we speak of affection, love and fear, but we also speak of attachment, closeness and withdrawal. Normally these expressions occur diffusely in our speech. Their clustering in the speech of our schizophrenic patients appears to have a special meaning.

The clusters take three forms and are related to the basic conceptual problems we have mentioned:

1) They represent a feeling of inability to maintain effective emotional relationships, particularly with the mother, expressed in terms of distance, isolation, separation.

2) They express a sense of dislocation between self and body, in terms of emptiness and bloatedness, confusion of inside and outside, confinement of the patient's feelings inside the body, or penetration of the patient by feelings of other people.

3) They express a wish by the patient to restore relationships with people, especially the mother, by some kind of motion through space—touching, reaching, searching, exploring.

The group of spatial expressions in the clusters includes the following types:

1. Expressions for direction or position in

[3] We wish to express our indebtedness to Drs. K. Salzinger and J. Oppenheim for their collaboration.

space: inside, outside, towards, away from.

2. Expressions for movement through space: making progress, wandering aimlessly, reaching out, picking up.
3. Expressions for continuity and proximity: attached, bound, close, distant.
4. Expressions for separation: isolated, cut off, out of contact.
5. Expressions for boundaries and traversing of boundaries: limits, borders, emerging, crossing.
6. Expressions for change in volume: bloated, shrunken, filled, emptied.
7. Purposive movements involving space: searching, discovering, hunting, chasing.
8. Expressions for visual projection in space: perspective, reflection, shadows, self-observation *via* mirrors.

In the interest of brevity only two examples of these clusters are presented. The first is from the speech of a woman of 22, who had entered the hospital some months before, after a period of compulsive eating and regressive behavior.

"And it seemed that *all my directions were getting gnarled and tangled up* . . . and I did not know *where I was going* after, *when June came, everything had sort of stopped* . . . and *I wound up* by coming to the hospital."

Below is an attempt to show that the meaning of the patient's statement could have been adequately conveyed without the use of the spatial expressions.

"And it seemed that my plans for the future were becoming confused . . . and I did not know what to do next, when in June all my efforts had failed . . . and I finally came to the hospital."

The second patient is a twenty-year-old woman who came to the hospital with a history of two years of dissociative episodes, ideas of reference and compulsive behavior.

". . . thoughts *that have come into my head*, that *I usually end up by throwing them out*. . . . Sometimes I feel like *I was a mixture of many shadows*, sort of *not one person*, but a lot of people's thoughts of me, like *self-reflections of these things*. . . . And each one *sees me in a different light* and actually *I appeared this way*."

And, again, our translation below.

". . . thoughts that I have had that I usually ignore. . . . Sometimes I feel that I play many roles, with no personality of my own but with different responses to different people's expectations of me. Each one has a different opinion of me and I actually act the way he thinks I should."

It is significant that the spatial clusters appear in the speech of the patient when he describes situations in which he feels deprivations for which he could imagine no possible activity of his own which could provide relief. They are absent when he discusses situations in which he has achieved some sort of gratifying rapport with other people. More detailed study of the pattern of spatial images used by each patient shows that his failure to solve the primary problem referred to above, that is, his inability to think of himself and his body as a functional unit co-extensive in space, is usually centered about parts of the body involved in an activity which has been grossly misinterpreted to him as a child. The usual signal for the start or completion of his activities, which normally comes from within his own body, appears to be replaced, under threat of physical and emotional abandonment, by signals coming from the mother.

For instance, a patient with problems of compulsive eating, whose feeding as a child was completely controlled by her mother, reported during a period of severe disturbance that she felt as if there were a large cavity in her abdomen in which other people's evil thoughts of her were "rattling around." If she stuffed the cavity with food the evil thoughts would be kept out.

Another patient, a young man who had suffered an acute paranoid episode, as a child was not allowed to go to sleep by his mother until he had performed an arithmetical

problem for her. He complained as a patient of a lack of "inner resources" for going to sleep or staying awake when he wanted to do either one. He felt that by looking into his eyes people could read his own contemptible thoughts.

In conclusion, we believe that the occurrence of these clusters of spatial expressions in the speech of adult patients represents the re-assertion, at a time of emotional stress, of a basic unsolved problem involving the relationships of self and body to each other and to other objects in space. This problem appears to be projected into the thinking of the adult patient, as we observe it in his speech, in the form in which it first developed during the earliest stages of conceptual maturation.

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A CRITICAL REVIEW OF RESEARCH ON THE CONCEPTUAL THINKING OF SCHIZOPHRENICS

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INTRODUCTION

It has long been recognized that the conceptual thinking of schizophrenics deviates from that of normals in many respects. In reviewing the research on this phenomenon, however, it soon becomes apparent that a great deal of confusion and controversy still exists regarding the nature and interpretation of the schizophrenics' conceptual performance. Some of this confusion may have arisen because, as Vinacke (60) points out, concept formation itself is a complex process that is but poorly understood generally. That aspect of the problem is not within the scope of this paper. What is important here is the suspicion that much of the current confusion seems to have arisen because the "facts". themselves appear contradictory, are not fully recognized, or are not well understood. The following review of the research on conceptual performance in schizophrenia is thus offered to point up certain points of controversy and areas where further research seems to be indicated.

THE NATURE OF THE CONCEPTUAL DEFICIT IN SCHIZOPHRENIA

Without taking too much license, it is possible to evaluate the research on conceptual thinking in schizophrenia historically, recognizing however that there may be considerable overlap in time between different phases of the research on this problem. In its initial stages, as a result of clinical observations and the early work of Vigotsky (59) and others, research interest was centered upon the apparent concreteness of schizophrenics' thinking, their apparent difficulty in generalizing, in seeing abstract relationships between things, or in shifting from one conceptual frame of reference to another. Accordingly, a great variety of conceptual tasks were developed to measure conceptual thinking in general and this apparent concreteness in particular, tasks in which the subject is generally asked either to build concepts from a set of stimuli, or to define or learn the concept represented by a predetermined set of stimuli. Responses to these tests have been classified in various ways (adding some small measure of confusion to the evaluation of different studies), ranging from the straightforward pass-fail of Feldman and Drasgow's test (14, 18) to the very complex scoring systems of the Object Sorting test (33, 34, 48). Conventionally, however, most of the early tests measured performance in terms of levels of conceptualization in view of the notion that schizophrenic thinking is abnormally concrete. Three such "levels" have most commonly been used, the concrete, the functional and the abstract. Responses are scored as concrete when classifications are made on the basis of non-essential, incidental features of objects. At the functional level classifications are made on the basis of use or value, while at the abstract or highest conceptual level classifications are made on the basis of abstract properties and characteristics. These three levels have been assumed to represent a continuum[2], based in part on evi-

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[2] A recent study by Silverstein (56) casts some doubt upon this assumption. From a cluster analysis of the performance of Rapaport's patrol groups on the Object Sorting Test, he concluded that while abstract and concrete definitions may constitute a continuum, functional definitions formed a cluster of their own. He felt that the

dence that attainment of these levels is related to the maturation process (44, 51).

Within this frame of reference that conceptual thinking can be measured in terms of levels, a substantial body of data has been collected comparing the performance of schizophrenics and normals. The results of these studies may be summarized as follows.

1) A variety of sorting tests have yielded evidence that some schizophrenics identify or construct fewer abstract relationships within the stimuli presented than normals (group differences have not always yielded statistically significant results); correspondingly, they tend to give more concrete responses than normals (26, 48, 50). In addition, there is some evidence that the schizophrenics not only have difficulty in formulating abstract concepts, but also have difficulty in shifting from one concept to another with the same set of stimuli (29, 49)). However, Feldman and Drasgow (18) state that the schizophrenics' deficit on conceptual tasks is determined more by their inability to formulate abstract concepts than by their inability to shift from one concept to another.

2) In defining proverbs, either verbally or by selecting alternatives from a multiple-choice form, schizophrenics give fewer abstract and more concrete responses than normals (15, 22, 24, 63).

3) Two studies have indicated that in defining words verbally schizophrenics give significantly fewer abstract responses than normals (17, 27), but one study reported nonsignificant results (39). Three studies also reported that schizophrenics choose fewer abstract definitions than normals from the alternatives of multiple-choice vocabulary tests (12, 20, 38), but again one study reported nonsignificant results (27). A study by Rabin, King and Ehrmann (45) evaluated three aspects of vocabulary performance: nonverbal performance on a picture vocabulary test, verbal vocabulary achievement, and level of verbal definition. Significant differences were found between long-term schizophrenics and normals on all three measures, but not betweeen short-term schizophrenics and normals.

The general conclusion reached in most of these studies was that a deficit in the conceptual performance of schizophrenics did exist, and that this deficit could be expressed in terms of a less abstract and/or more concrete level of responding relative to normal expectancy. Some evidence has been presented, furthermore, that the same kind of deficit can be demonstrated in schizophrenic children (21, 53). In the early stages of the research on this problem, this deficit was frequently interpreted as indicating an impairment of conceptual ability, in the sense of a specific cognitive factor. To some, therefore, the impairment of this ability was suggestive of actual organic involvement (23, 26, 59). In the last decade especially, however, there has been a growing awareness that other factors besides conceptual ability *per se* are being measured on conceptual tasks. These later studies have shown that the conceptual performance of schizophrenics may be more or less deviant as a function of the content and structure of the task itself and the composition of the schizophrenic sample.

TASK CONTENT AND STRUCTURE

1) Studies by Whiteman (65, 66) and Affleck (1) have consistently demonstrated that the schizophrenics' deficit on conceptual tasks is increased when "social or "interpersonal content is involved, as opposed to formal concepts such as number or size. Furthermore, at least one study reported evidence that this deficit is increased when the task involves personal reference as against impersonal content (54).

2) Studies by Richman (52) and Wexler (64) have indicated that "emotionally-toned content may also increase the schizophrenics' deficit on conceptual tasks." On the other

order abstract-concrete-functional corresponded more closely to the data than the usual order abstract-functional-concrete.

hand, Cohen, Senf and Huston (13) found that affective stimuli did not affect conceptual performance unless presented simultaneously with amobarbital (amytal). In this latter study, however, neurotics rather than normals were used as controls, possibly reducing the magnitude of the differences.

3) A study by Heath (28) suggested that the schizophrenics' deficit is increased by personally threatening topics, *i.e.*, that anxiety impairs concept formation. This conclusion has been supported in a dissertation study by Tomblen (58). Anxiety has also been shown to impair conceptual performance in non-psychotic psychiatric groups (55) and in normal subjects (48).

4) Somewhat related to the above, Webb (61) hypothesized that threat of failure may increase conceptual deficit among schizophrenics. His subjects were told they had done poorly on a similarities pretest, and when compared with normals on an alternative post-test, did not improve their performance, in significant contrast to the normals. A similar study by Maginley (35), in which the threat of failure consisted of saying "no good" and/or flashing a blue light while the subjects were trying to learn a concept, did not significantly discriminate schizophrenics from normals. The results were in the same direction as Webb's, however.

5) An important study by Cavanaugh (7) has suggested that the performance of schizophrenics on conceptual tasks can be improved when adequate performance results in the removal of an aversive stimulus. His subjects significantly bettered their performance on both formal and social concept formation tests when white noise was used as an aversive stimulus. Under this condition the performance of the schizophrenics approximated that of the normal control group. (Similar results, using a complex discrimination reaction-time problem, were achieved by Pascal and Swensen (41)).

6) Less attention has been given to the relation of task structure to conceptual performance than has been given to concept content. There is some evidence that conceptual deficit is increased among schizophrenics on conceptual tasks requiring sustained attention, and on relatively unstructured tasks (25, 54). Possibly this deficit is also increased when active verbalization is required as against nonverbal performance (27), or when active formulation of concepts is required as against passive identification of relationships (48). In general, however, these hypotheses must be regarded as tentative since replication of these findings has not been attempted.

SAMPLING VARIABLES

Thus far in this discussion conceptual deficit has been treated as a general characteristic of schizophrenia. This is actually misleading, since not all schizophrenics may deviate significantly from normals in their conceptual performance. Estimates vary as to the proportion of schizophrenics who do not manifest such a deficit. Hanfmann and Kasanin (26), for example, using Vigotsky's test, found that 18 per cent of their subjects showed little or no deficit, 40 per cent showed mild to moderate deficit, and 42 per cent showed marked deficit. On the other hand, Feldman and Drasgow (18) obtained nonoverlapping distributions with their test. In part these differences are probably a function of the content and structure of the task used, but another important source of variance is the schizophrenic sample itself. Certain sampling characteristics appear to be directly related to the adequacy of conceptual performance, but these variables have not always been fully appreciated in published research. Education and IQ, for example have not always been controlled, although the majority of studies investigating these factors have found them to be positively and significantly related to level of conceptual achievement. McGaughran and Moran (34) go so far as to state that in their study differences in level of conceptualization between schizophrenics and normals were more closely associated with estimated task

ntelligence than with the presence or ab-ence of schizophrenia. Chapman (8–10), owever, controlled for education in his tudies but felt that significant differences n IQ between controls and schizophrenics ould be disregarded as a function of the atter's pathology. On the other hand, Weck-wicz and Blewitt (62) found that both the ested level of intelligence and the estimated premorbid IQ of their schizophrenics cor-related significantly with level of conceptual attainment, casting some doubt on Chap-man's procedure.

Another sampling factor which appears to be related to conceptual performance is length of hospitalization. A number of studies have consistently demonstrated that chronic, deteriorated schizophrenics demon-strate greater deficit on conceptual tasks than early or acute schizophrenics (2, 17, 22, 30, 45, 48). There is less general agreement as to whether early or acute schizophrenics differ significantly from normals in their per-formance. Fey (19) and Glass (22) both found a significant deficit among early schizo-phrenics relative to normals. Maginley (35) found early schizophrenics to be consistently inferior to normals in his study, but the mag-nitude of the differences was not significant. Rabin, King and Ehrmann (45) found no sig-nificant differences between early schizo-phrenics and controls. In general, however, it appears that there may be a positive relation-ship between length of hospitalization and amount of deficit on conceptual tasks, with the greatest deficit occurring in the chronic group. Rapaport (48) suggests further that, within the schizophrenic group, length of hospitalization contributes more to concep-tual performance than diagnostic subtype. The latter is one of the least often controlled or reported sampling factors, probably be-cause it is one of the most difficult to control, owing to differences in diagnostic policy be-tween hospitals, changes in a patient's diag-nosis over a period of time, and so on. There is some evidence that paranoid schizophren-ics demonstrate the least deficit (24, 48, 62, 63) and hebephrenics the most (63), but ob-viously these findings may be a more direct reflection of other factors, such as severity of illness or degree of disorganization. It would probably be more meaningful in this respect to deal with the specific behaviors upon which diagnoses or judgments about severity of illness are based. At present this remains an obscure area: there have been no systema-tic studies of the gross behavioral covariates of conceptual deficit, although evidence is accumulating that personality and socio-cultural factors have an important bearing on conceptual performance (32, 40). In general, the research to date can and has been criticized (46) for its failure to ade-quately consider the heterogeneity of schizo-phrenia.

In summary, there is considerable evidence that the conceptual performance of schizo-phrenics is a much more complex phenome-non than was once thought. The magnitude of differences between schizophrenics and normals on conceptual tasks has been shown to covary with a large number of factors in both the content and structure of the task itself and the composition of the schizo-phrenic sample. Undoubtedly other such factors must remain to be described, par-ticularly in the area of sampling character-istics. It has been increasingly obvious, in other words, that conceptual ability—in the sense of a cognitive factor again—is not the only variable being measured on conceptual tasks. Some authors have then extended this line of reasoning to propose that conceptual ability may not even be the primary source of error in the conceptual performance of schizophrenics. That is to say, it can be hypothesized that conceptual ability *per se* merely appears impaired because of some other deficit-producing factors involved in the performance.

At the present time there are two major hypotheses which have been proposed as alternatives to the hypothesis that deviant performance results from impaired ability. One hypothesis involves the factor of social

communicability. Cameron (3–6), and others have for a long time hypothesized that what appears as a deficit in conceptual ability is primarily a reflection of the schizophrenic's social disarticulation and autism. The schizophrenic can conceptualize, they believe, but does so in such an autistic fashion that it is not recognized as being abstract. Studies demonstrating that conceptual deficit increases as the interpersonal content of the task is increased have been interpreted as lending indirect support to this hypothesis (1, 20, 65, 66). A more direct test of Cameron's hypothesis was made in a study by McGaughran and Moran (34), who investigated whether conceptual deficit could best be characterized as a disturbance of social communication as opposed to the alternative hypothesis that schizophrenics are abnormally concrete. Using Rapaport's Object Sorting test, they did not find any significant differences between their schizophrenic sample (chronic paranoids) and controls when performance was scored for conceptual level by a modification of Rapaport's system, after partialling out the effects of IQ. (Whether there were any differences between the "active" and "passive" parts of the test was not reported.) On the other hand, MaGaughran and Moran were able to demonstrate a significant loss in social communication by their own method of rating the communicability of the concepts. They concluded, therefore, that schizophrenics are able to conceptualize, but in an autistic fashion that is often scored as concrete by the usual criteria. More recently, however, Weckowicz and Blewett (62) attempted to replicate McGaughran and Moran's study with a more heterogeneous sample and obtained the opposite effect: they demonstrated a deficit in conceptual level but not in social communicability. At the present time, therefore, it still remains to be seen whether the disturbance in social communication by itself is sufficient to account for the deficit in schizophrenics' conceptual performance.

The second major alternative to the hypothesis that schizophrenics are abnormally concrete proposes that "overinclusiveness" or the tendency to respond to irrelevant internal and external stimuli is primarily responsible for the deficit in conceptual performance. Cameron, who observed this characteristic in the sorting behavior of some of his subjects, defined overinclusion as "an exaggerated instability of behavior organization in which the number and kind of simultaneously effective excitants are not restricted to a relatively few coherent ones (6, p. 457). Epstein (16) constructed a paper-and-pencil test to measure overinclusiveness in which the subject is told to underline words essential for describing a given stimulus word. It was found that as a group schizophrenics overincluded unessential words significantly more often than normal controls. (They did not differ from the controls with regard to the opposite tendency, underinclusion.) In fact, the schizophrenics overresponded to words the meaning of which they did not even know. Recently Mednick (37) has formulated this phenomenon in terms of learning theory; his theory has since received some experimental support in a study by Woods (67).

Supporters of this hypothesis have argued that conceptual ability merely seems impaired because adequate conceptual performance is prevented by this over-responsiveness to extraneous stimuli. There is some evidence that overinclusiveness and impaired conceptualization occur together, which might lend some indirect support to this hypothesis. Using a free verbalization test, Meadow, Greenblatt and Solomon (36) demonstrated a positive correlation between looseness of association—which is assumed to be related to overinclusion—and impairment in abstraction. Similar indirect support might be found in a factor analytic study by Rablen (47), who felt that both impaired conceptual ability and overinclusiveness could be included in the same dimension of psychopathology in chronic schizophrenics.

A series of experiments by Chapman (8, 9)

and Chapman and Taylor (11) offers a more direct test of the overinclusion hypothesis. Using a card-sorting task in which were present incorrect elements similar to the correct elements for sorting, Chapman demonstrated that the schizophrenics used the incorrect "distracter" communalities as a basis for sorting significantly more often than normals. As the number of distracter communalities increased, the schizophrenics' error curve diverged from the normal error curve, and when the distracters were not present, the performance of the schizophrenics was more nearly like that of the normals. These findings were interpreted as indicating that the schizophrenic deficit on conceptual tasks is in part the result of their being overly responsive to distractions, preventing correct performance on the task. Furthermore, Chapman concluded that his results did not indicate a lowered ability to form concepts, since some degree of conceptualization was necessary for the schizophrenics to respond to these distractions. It should be noted, however, that Chapman was actually only testing whether the schizophrenics could form concepts at all, which is not an adequate test of whether the *level* of their conceptualization is impaired. In a later study (10) Chapman attempted to remedy this defect by varying the difficulty of the conceptual tasks on two levels, in order to simultaneously test responsiveness to associative distractions and conceptual ability *per se*. It was then found that both the level of concept difficulty and the presence of associative distractions interacted strongly to adversely influence conceptual performance, from which it was concluded that there was support for both the hypothesis of impaired ability and the overinclusion hypothesis.

The controversy over the relationship between these two variables was recently revived, however, by Payne, Mattusek and George (43). After reviewing the literature they concluded that there was no substantial evidence to support the hypothesis that schizophrenics are abnormally concrete. They felt that the data could more readily be interpreted to support the overinclusion hypothesis. To test both hypotheses directly, a large battery of tests was constructed. Of thirteen different overinclusion scores derived from this battery, nine significantly differentiated the schizophrenics from the control group, and the other four scores were in the same direction. Of the five measures of concreteness used, only one (the Object Sorting test) significantly differentiated between schizophrenics and normals. This latter finding was explained away as being "due to the heterogeneous nature of the material, which favored the production of unusual, 'over-inclusive' responses, some of which are labelled 'concrete' when Goldstein's criteria are applied (43, p. 650)". At the same time, however, the authors reported that the other four measures of concreteness just failed to reach significance. As complex as this study is, it has certain limitations which suggest that the final word has not been heard on this problem. For one thing, neurotics were used as controls in this study, and there is some evidence (48) that this would diminish the magnitude of the differences on the tests of concreteness, since some neurotics approach some schizophrenic types in their conceptual performance. Secondly, it should be noted that no chronic schizophrenics were included in this study, which, as discussed previously, could diminish the magnitude of the results obtained since concreteness has been demonstrated to be more pronounced in the chronic population.

SUMMARY AND DISCUSSION

In the last 30 years it has been rather conclusively demonstrated that the conceptual performance of schizophrenics, or at least of some schizophrenics, deviates from the performance of normals in many respects. A great deal of controversy still exists, however, regarding the nature of this deficit. The early research on this problem tended to

characterize schizophrenic performance as abnormally concrete, and inferred from this that conceptual *ability* is impaired. Later research, however, demonstrated that this deficit in conceptual performance was selective, and that other factors in addition to conceptual ability were being measured on conceptual tasks. Consequently, it is still difficult to state with assurance, in spite of the impressive amount of research on this problem, that the ability to formulate abstract concepts is in fact impaired in schizophrenia. One of the main reasons for this state of affairs lies in the nature of the conceptual tasks themselves. Most of the conventional tests were primarily designed to discriminate schizophrenics from normals and other clinical groups for diagnostic and prognostic purposes. They were not so much concerned with measuring gradations of ability, in contrast to most intelligence tests, for example. Items having face validity were assembled without much regard for their relative levels of difficulty. Therefore it can be argued that most of these tests are actually measuring only *consistency* of conceptual performance, regardless of whether the responses are scored for "level" of conceptualization along the conventional abstract - functional - concrete continuum. Cameron and others have argued that it is this consistency of conceptual performance which is impaired rather than conceptual ability *per se*. They hypothesize that overresponsiveness to irrelevant and extraneous stimuli prevents adequate conceptual performance in schizophrenia. Substantial evidence has been accumulated to indicate that schizophrenics are "overinclusive", but whether this factor by itself is sufficient to account for the deficit in conceptual performance cannot be decided until the question of whether ability is also impaired is settled. A necessary requirement would seem to be the construction of new concept formation tests in which the difficulty of the individual items is systematically varied. Secondly, in order to approach a *de facto* test of ability, the opportunity for making irrelevant responses must be minimized. As Payne, Mattusek and George (43) have pointed out, some of the present tests favor the production of irrelevant responses, thus obscuring the question of whether ability is actually impaired. Semi-structured tests like the Object Sorting, for example, have been the most controversial in terms of what they are really measuring. Thirdly, the need for considering differences in performance within the schizophrenic population has been pointed up in this review and elsewhere (46), as well as the need for greater awareness of the effect of task content and structure, and sampling factors, on conceptual performance. The problem is certainly much more complex than was first realized 30 years ago, but the increasing interest it has attracted in recent years offers some hope of a better understanding of schizophrenic thinking and of schizophrenia itself.

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THE CULTURAL CIRCUIT IN PSYCHOLOGY AND PSYCHIATRY

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NEUROPHYSIOLOGICAL AND PSYCHOLOGICAL FOUNDATIONS

The aim of this article is to make a contribution to the understanding of how men behave in society. The argument rests on an hypothesis with respect to the existence of a cultural circuit in psychology and psychiatry. Accordingly, two chief additions to the current findings in these sciences will be proposed here. These are: first, the changes effected by the orientation of the human organism toward material objects, and second, revisions necessitated by the consideration of the integrative levels.

In every instance of the study of the behavior of animals, we have to ask ourselves some questions concerning the effect of the environment upon them. And when we do so it is necessary to remember that the animals are themselves products of the environment and engaged in a constant process of interchange with it. For the most part, it is not the entire environment that takes part in the interchange, but only that part of the environment within reach. But it is the whole animal. Thus the effect of the environment on the animal is greater than the effect of the animal on the environment. There is an effect on the environment, however, and an important one. As a matter of fact, men have made considerable alterations in their environment. It is to a large extent the result of their activities. Thus the study of human behavior can hardly leave out the material objects by which men are surrounded and which they have had a hand in the making. If the science of psychology has concentrated on the organism to the exclusion of the environment, when it was supposed to study the relationships between organism and environment, as Brunswik (6) said, then it is because the environment was represented only by an object that was kept non-specific, reference being made to nothing more particular, say, than the ecological field in which broad space relationships furnish the cues. What are needed instead are specific organized material objects as cue-sources.

In certain aspects of behavior theory the study of effects is undertaken in order to determine causes, and there is some danger of faulty design in committing the logical error of affirming the consequent. In addition, the statistical studies of responses are made to yield results on the method of inverse probability. However, much valuable material has been uncovered in the course of learning investigations. The difficulty lies, perhaps, in the arbitrary limits of the conception of stimulus and response as an isolable subject matter.

Despite the introduction of cybernetic notions into neurophysiology, much remains to be done with it in psychology. The attempt will be made here to construct an hypothesis to enlarge and extend the feedback mechanism into a cultural circuit which would incorporate artifacts within the model of the servomechanism. But before this can be done, some preliminary definitions are necessary.

By 'psychological circuit' will be meant the cognitional level of stimulus and response extended to include a material object in a negative feedback in which the bias of the drive can be shifted, *i.e.* a tuneable homeostat. The negative feedback, it will be maintained, operates in this case between artifact and central nervous system in a complex set of interactions. The model of negative feedback replaces the stimulus-response model which has been the standard for some time,

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but the negative feedback is not an adequate model unless the material object, which is the source of the original stimulus and the recipient of the final response, is included in the circuit. For the circuit, as McCulloch pointed out, extends beyond the somatic organism (23) and is constructed to include some segment of the environment (24). The activation of such a circuit is of course continuous. Negative feedback models when employed in psychology characteristically overlook the importance of the role played by the artifact. The consideration of the psychological subject in its aspect as servomechanism calls for the interaction with artifacts to the consequent alteration of both subject and artifact. The continual modification of the subject by responses changes the available cues and hence the stimuli, and eventually even the responses themselves, which issue again in further modifications. Previous stimuli have the effect of conditioning the reception of later stimuli. After a sufficient number of operations, such repeated interactions construct a network of relationships between organisms and material objects in the available environment sufficient to carry the functioning of the psychological subject.

By 'cultural circuit' will be meant that circuit which results from the substitution of another person (or other persons) for the artifact in the psychological circuit, with the modifications and additions consequent upon such substitution.

By 'artifact' will be meant a material object altered through human agency. Thus a fence is an artifact. A tree is not, unless it has been grafted or its growth in some way influenced, but a formal garden is. The term must be conceived as possibly covering a collection of artifacts, such as a house, or an artifactual system, such as a capital city. The use of the term 'artifact' here needs to be distinguished from the biological use of the term in which it denotes material faults in experimental technique, and from the archaeological use in which it is reserved for the material objects found in the unearthing of past cultures. In the sense intended throughout this essay, the living person is profusely surrounded by artifacts of a present culture.

By 'available environment' will be meant that part of the environment with which an organism effectively interacts. It interacts presumably with the total environment, but the presence or absence of food, air or other and similar organisms may affect it more specifically than Arcturus or Betelgeuse. The milieu, the immediate, available environment of the human individual, consists in artifacts and other persons.

There are three integrative levels with which we shall be concerned. These are the neurophysiological, the psychological and the cultural. At the neurophysiological level, we are dealing with simple types of returnable circuits, at the psychological level with full servomechanisms, and at the cultural level with servomechanisms having tuneable homeostats. For example consider a correlative event; this would be noted in neurophysiology as a movement, in psychology as an action and in culture as behavior. The conception of laminated integrative levels in the central nervous system is not new. Toward the end of the nineteenth century Hughlings Jackson had posited the existence of levels of activity in the central nervous system (16). Ascending sensorimotor impulses traverse spinal, brain stem and thalamic projections. The tendency to find three separate but related structures within the central nervous system is in fact widespread. Galambos, for instance, finds that he can account for learning, motivation and attention by reference to the traditional afferent pathways, to the limbic midbrain circuit, and to the reticular formation, respectively (9). Consistent with this would be Bradley's hypothesis that there are three sites of action for drugs and consequently three distinct receptors in the central nervous system: the

brain stem reticular formation, the diffuse thalamic projection system, and the afferent input into the reticular formation (3).

The neurophysiological circuit has been described in terms of axo-dendritic-synaptic transmissions along a reflex arc, and the cortical mapping of receptors has been in progress for some time; but lately it has begun to appear to be far more complicated and non-linear. We have been accustomed to think of stimulus and response or of conditioned and unconditioned responses, thus gradually ignoring the stimulus. But as has been pointed out, the circuit is returnable, and we need it again to account for interactions; hence we are concerned to note the effect produced by any changes within it. For instance, there is some evidence that the brain stem reticular formation exercises efferent control over afferent impulses so that the organism to some extent selects what shall influence it. To say, however, that the organism chooses those sensory stimuli by which it intends to be affected means only that the discrimination of complex stimulus patterns is conducted in terms of the previous history of such interactions. Receptors operating as far along as the brain stem function also as regulators: exciting or inhibiting (8, 13, 19, 21).

The entire mechanism of the central nervous system is geared to keep the organism in contact with the material objects of the external world. It is true, of course, that the nervous system has other functions; but then it is capable of simultaneous diverse activity (4) and there is a dynamics of the whole brain (17). We shall have to take into consideration the effect of the psychology of objects in the solid state in motion relative to the observer, with the artifact as a sequence of values of stimulus-variables and its image as a projection of the world (11). Psychology has been oriented altogether in the direction of the subject but studies the interaction between macrocosmic artifacts and microcosmic neurons.

The stimulation of a subject by an artifact goes through a psychological circuit to produce a response which issues in effects on the artifact; and this sequence reactivates the circuit. The effect of an artifact on a psychological subject, in other words, is stretched to include the effect of the subject on the artifact. And this effect can itself constitute a second negative feedback mechanism: the artifact, to some extent at least, operates in conformity with its own structure, often in unanticipated ways; and, as we shall see later, the interaction is often focused on a second person. This in brief is the psychological circuit, and, when an other-person is substituted for the artifact, it is the cultural circuit. Such energy interchanges are necessary for the maintenance of steady states. The circuit begins before the stimulus, with the artifact responsible for it, and continues after the artifact receives the impact of the response in a series of self-modifying loops.

If psychology is the study of the relations between organism and environment, is, in fact, human ecology, then the stimuli can no longer be the monotonous, anonymous and undifferentiated affairs they have been thought to be but instead must be taken into the account by means of a more active and specific description. The organism lives in the environment from which it first issued, and continues to be subject to influences from that environment. Sherrington believed that the distance-receptors, and vision in particular, are necessary to the development of highly integrated reactions and even to memory (35). We must look for conceptual cues outside the subject, therefore, and independently of the reflex arc. These are to be located in a material object in space and, since they are repeated, also in time. It is only when we begin to have regard for their connection with the organism that we can consider them in their aspect as distal stimuli and as having their effects upon proximal sensory inputs. But the emphasis in this study must be placed on distal rather than

proximal variables, and we must look for the meaning of the exteroceptively-evoked response.

Patterns of instinctive behavior are fired by impulses initiated somewhere between distal stimuli and the central process. The process begins with primitive probings involving sensory contact: with such efforts as visual scanning, auditory attentiveness and manipulation, each prompted by curiosity. Not enough has been said about the effect of the sensory receptors as mutual reinforcers which operate here to constitute a generalized drive: the object-oriented integration of the organism. The descending functional projection system must be conceived as extending to goal-objects. Multiple perception, the coordination of the various sense receptors on a single material object or artifact, requires that each percept in immediate perception be read as a fragment which multiple perception validates as a whole (7). Cognition and behavior are the processes which accept or correct the original perceptions.

Perception itself is a skill of the qualitative variety. The activity of selection is conditioned not only by the history of interests but also by training. However, nothing perceptual may be regarded as a simple response. The stimulus has two parts: the reception of cues from the artifact and the transmission of afferent impulses along the nerve fibers. Response itself occurs later and is far more sophisticated even at the level of the psychological circuit. The psychological circuit operates continually; so far as stimulation by the same artifact is repeated, it begins the support of inferential material; for there is the primitive discrimination between the source of the stimulus and the content of the stimulus; in short, a message. According to recent researches, it is the posterior intrinsic system, the reticular brain stem, which functions in the gathering of information (1, 27, 31).

In general it may be asserted that the drives are based on the objective and external integrative levels in which the goals exist: survival on the physical level, hunger on the biological, sex on the psychological and curiosity on the cultural. In every instance, of course, the goal-seeking occurs in terms of specific natural objects: the pursuit of a state of health, the search for food, a mate or the knowledge of an explanation. Motivation is in evidence equally on the negative side: the avoidance of an enemy or threat, and of stimulation by pain, hunger pangs, sexual craving, and doubt, respectively. Many other drives do exist, as illustrated by Tolman's list (38), but these are the fundamental ones. Genetically of course each of the levels is chronologically later as well as structurally higher. There are no precise boundaries; each level presupposes the ones below it and rises qualitatively above.

We are interested in the cultural level, and of course its dependence upon the reflex arc is assumed. It is not to the purpose here to elaborate the functioning of the receptors, conduction along the afferent nerve fibers, or central impressions involving spinal cord or brain stem, although the thalamic integration of sensory impulses is suggestive. And later we shall not be concerned to follow the steps whereby contact is made with motor cells and conduction resumed along efferent pathways to the terminals in the tissues of muscle fibers, even though the fact that skilled movements are probably initiated in connection with the precentral gyrus is relevant. This is the neurophysiological circuit, and it is more primitive and more fundamental than the psychological circuit. At this point it should be remembered that the lower integrative levels determine higher: causes always lie at one integrative level lower than effects, simpler causes producing complex effects. The structure apposite to the present purpose is higher and is superimposed upon the lower neurological processes by which it is carried. Equilibrium is a steady state; and a steady state at a given level, say the psychological, requires a fixed

rate of change at the next lower level, say the neurophysiological. The behavior of an organism could be predicted by the probabilities of an open system given sufficient information about the initial structure as a complex set of variables.

In a certain sense, the organism is helpless in the hands of the data. The world is larger than man and he must accommodate himself to it, not it to him. Reliance on the world is continuous and contact with it is never broken. Consciousness seems to be made possible by the balanced functioning of the reticulo-hypothalamic-cortical system (10), but the fact that uniform stimulation produces loss of consciousness indicates a neurological dependence on the external world (39). Long ago, Hobbes observed that "it is all one to be always sensible of the same thing and not to be sensible of anything" (15), and Mill knew that "all consciousness is of difference" (28). We are not aware of our receptors but of objects beyond them, and it is those objects which play a necessary cortical role (10, pp. 191, 425). Consciousness then, is consciousness *of* something, and that something has to be discriminated, which it could not be were there no differences.

Every artifact from the point of view of the organism's awareness of it consists in an infinite set of cues, visual, tactile, auditory, etc., contained as information display variables. Large areas of the cerebral cortex are evidently required to function simultaneously in order to provide for the adjustment of the organism to the environment. It is part of the inherently extended nature of sensory experience that every contact with an artifact makes more of an impression on the organism than is needed for the interaction. The result is a dynamic effect on the organism's selection of its subsequent cues and the initation of a recursive circuit.

The analogy with engineering psychology holds. The artificer may be considered a monitor of programmed operations, and his responses as measuring the recognition of the state of the system. Such responses issue in the stimulation of artifacts, by revised programming. True, the organism exercises a certain measure of control over what will constitute stimulation. In particular, it would seem that the frontal and limbic systems are responsible for the adjustment of perturbations in dispositional states. But once a stimulus (*i.e.* an artifact or an artifactual situation) has been elected for the focusing of attention, the force of the arousal is determined by the extent to which the stimulus departs from expectation or contains an element of surprise.

Curiosity is a basic tissue need of the neuronal aggregates. It orients responses in proportion as the stimulus introduces surprises. To understand what modifications are made in the afferent activity, it would be necessary to know what modifications had already been made in the central nervous system by such activity previously; we have argued already that there are modifications in what may be characterized as a subsidiary feedback. Monkeys do exhibit curiosity; but the gratification of inquiry in man requires the inclusion of artifacts and interpersonal relations extending into the external world far beyond any sensation of pleasure that can be reached by stimulation through chronically implanted electrodes. There exists a complexity of interactions, so that to formalize the discharge of receptors, to ground neurally the rudimentary intuitions representing impressions, in short to comprehend fully the operation which takes place between artifactual cues and subjective reception, involves the knowledge of a code to which we do not yet have the key.

From the neurophysiological model of the organism as a simple mechanism in which responses are wholly controlled by the stimuli, to the more complex conception of an organism which can to a large extent influence the character of its stimulation, either by selection or alteration of the artifact, is not a change in theory but merely a building to higher levels. The all-or-nothing reaction of the reflex arc remains;

what is superimposed upon it is the graded response of the neuronal aggregates. The sophisticated stimulus is the action exercised *upon* artifacts; the sophisticated response is the action exercised *by* artifacts; and these are not the same. To understand the role of the organism in an environment, it is necessary to consider the stimulus constituted by its role as artificer, to trace a response constituted by its role as operator, and to understand the code by which they are connected.

Appetitive-consummatory processes in the case of the basic tissue need of curiosity will nominally consist in the thirst for, and the acquisition of, knowledge. The organism wants to know how it should act under certain circumstances even though the occasion never arise, and this knowledge is to be found in the effects of its previous actions. Thus it is that impulses in the circuit travel a parabolic route between artifactual and subjective poles. Knowledge is for the sake of action, but also learning requires the alteration of artifacts; experiments in the physical sciences, for example, conducted for purposes of inquiry. Thus the acquisition of knowledge involves a circuit which begins and ends with the artifact.

Impression leads to retention by validating the correspondence between artifact and cognition. Retention involves a change of state in the neurons; in some way we do not as yet understand, the excitation of tissue is involved in the recording and storing of information so that the engram is made responsible for the proper recall. The storing of information involves its rearrangement as complex systems of strategies; in the lower animals patterns of instinctive behavior, in man the preparation of abstract structures for use as tactics. Memory, in a word, anticipates behavior.

Retained material is not, however, quiescent; there is an internal background of neural activity. Berger's alpha rhythm is abolished by conscious mental activity, but not so the higher frequency beta waves; and the delta waves are still present in sleep. No matter how far the environmental stimuli are reduced (they cannot be eliminated altogether from a living organism), there would appear to be some activity, often even seemingly self-generated and prolonged, perhaps organizational in character (29). For there is information already present and in need of working over. Also, there is continuous input whether or not there is recall, and such modifications take the form of stimuli which intrude upon the internal background without disturbing the foreground of focused attention. As further messages are received, they are sorted; some are relevant, others not. The relevant messages function to modify the retained material.

At the neurophysiological level tissue needs prepare responses for triggering by appropriate external stimuli. At the psychological level also, releasing mechanisms operate in connection with innate behavior patterns. Retained beyond these, however much they may affect certain dispositions, are others of a more established character. Sunk deep into the tissue of the neuronal aggregates are the stable dispositional states. The circuit from artifactual stimulus to responses issuing in action upon artifacts would appear to have been interrupted, but it has been merely postponed. A belief is a delayed response. Should the occasion never arise to trigger it into action, the delay may be permanent, but the belief remains, retained in the tissues in which it can in fact become incorporated.

Stability of behavior involves the retention of a disposition to act. But there are already other dispositions. The patient has collected a history, and the more cumulative the more determinative. From the innumerable and continuous transactions between stimulus and subject, there has emerged slowly the construction of a private retention schema.

By 'private retention schema' here is meant an unconscious set of experientially acquired and emotionally accepted and

endorsed dispositional states. The private schema has a core of stability but a peripheral area of change. It requires and receives occasional reinforcement. We shall see in the next section that there is also a public schema, and the elements of the two schemata are rarely sorted. Since there is evidence that the brain stem reticular formation functions in the waking states (25, 26), it is probable that the retention schemata are cortically related.

Representation occurs only while a proposition is being transacted. The proposition is then represented by its corresponding feeling. Abstraction may result from the closing of the neural network and the consequent reverberation of the message. Dispositions to act are reinforced through the repetition of behavior patterns until habit furnishes recognizable degrees of associative strengths. Intentions tend not only to persist but also to concentrate; habit rolls them up into something solid and almost substantial. But actions are necessary to maintain dispositional states, if the continual contact with artifacts is to constitute a recursive circuit.

A dispositional state is knowledge looked at from the nature of its apprehension. If a disposition is a delayed response, there is always the possibility of a response. The spontaneous discharge of receptors can be interpreted as one variety of delayed response. The continuous excitation of the psychological circuit involves the extended activity of the cortical cells. Centrally aroused sensations can occur after such extended activity. In many cases of the excitation of neuronal aggregates, the response exceeds in duration and frequency the initial stimulation. This, too, can have its pathological exaggeration. Impressions made are tissue memories; they can be recalled. The recall of unconscious beliefs is a result of organic-level behavior patterns. Instinctive actions represent unconscious beliefs. Taxis-controlled motions equally point to dependence on the original stimuli of the artifact now functioning as the recipient of the effects of innate motor patterns. There can be at this level completeness of motor patterns discharged without biological meaning, such as the displacement behavior studied by Lorenz, Tinbergen and others, in which a frustrated instinctive action is discharged into the channels of another and quite different instinctive action (22, 33, 36, 37).

We shall see that in the case of conscious beliefs, the recall is stimulated deliberately (the will). A conditioned response under the direction of self-controlled receptors when engaged in the act of anticipation becomes a servomechanism. Voluntaristic impulses travel a negative feedback circuit. The subject remembers what it is that he believes, only this time in terms of the action singled out, of what it was that he wanted to do. There are motor patterns to be called upon there. Drive-reduction is brought about by the exercise of motor skills, but first there must be an incentive and an expectancy. For the most part, goal-setting is focused on the alteration of artifacts. The motivations are not furnished by other human individuals as they are at still higher levels, but the humans get dragged along in the wake of such alterations. The pathological aspect in this connection is the anxiety involved in the anticipation of failure. The aspiration toward achievement-levels is dependent upon a cognitional approach, since expectancy-value is measured by awareness of skills and effects ("know-how").

There is thus one new element which occurs in the process at this point. In the psychological circuit, the subject exercises a certain measure of control over its own activities, however they may have been stimulated. The resulting changes in the artifact may or may not correspond exactly to the incentive of dispositional states, but there is an effort at control which is to some extent successful even though it may fall somewhat short. Whether or not the concept of graded response will be adopted to re-

place the all-or-nothing response in order to account for the control of action in higher organisms, remains to be decided by further evidence. In either case, it is clear that the role played by the cognitive consciousness has been grievously neglected. Voluntaristic alternatives are presented by the condition of the artifact; they are selected by ratiocinative methods.

The impulse to action is an imbalance and an irritation, a painful dispositional state. Equilibrium can be restored only by the appropriate action. Thus decisions are relief mechanisms designed to facilitate the evacuation of surplus emotional content. Regulatory mechanisms responsible for the maintenance of homeostasis may be partly responsible also for the discharge of impulses to action. Brain stem ventricles have been suspected of functioning as homeostats in this connection. Activity would have to be included in their zone of reference as much as other sensitivities, such as body temperature or food intake. There is, in short, a need to act, and the circuit that was initiated by artifactual cues and that now issues in muscular exertion against material resistance is one kind of appetitive-consummatory process. The functional localization made possible by efferent pathways and effector mechanisms: muscles, glands, etc., only serves to furnish clear channels. The action itself issues in the alteration of the artifact.

Thus we are back at the artifact which was the source of the original stimulus; only this time instead of furnishing cues it is the recipient of the effects, in short of action. It is in this way that the artifact is made and operated. The action transforms the artifact, which is thus in a condition to offer a fresh set of cues and ready to stimulate another set of responses and so to initiate another activation of the circuit. Gradually, as a result of repetitions of these activations, an artifactual environment is built up in such a way that the organism can determine its own stimulations. To account for this phenomenon fully, however, another element will have to be introduced.

This final element is the independent behavior of the artifact itself. In considering interactions between organism and environment, we have been assuming that the behavior of the artifact is just what the organism determines it to be. But there are after all also artifactual receptors, exemplified by such purely physical phenomena as surface resistance to contact, compression waves, deformation, etc., evidence that each artifact possesses its own organization. Small causes may give rise to large effects, and no one who initiates a course of action can successfully predict all of its consequences. The artifact to some extent leads a life of its own, exhibiting a pattern of behavior at least partly dictated by its own configurations; and this behavior often redounds to the detriment of the organism in ways which were not anticipated. Men killed by motor cars they have manufactured as the result of traffic accidents they had not intended; occupational diseases of many sorts; professional attitudes and lives—the list is a long one. The effect of the organism on the artifact is limited by the intractability of the material selected and the pattern followed; the effect of the artifact on the organism is limited by the self-contained nature of the organization of the artifact.

THE CULTURAL CIRCUIT

We have been endeavoring to separate out the various strands of the neurophysiological and psychological circuits; the former a repeating type of stimulus-response mechanism, the latter widened to include stimuli from and responses to specific material artifacts. We are now ready to extend the model further to include also interpersonal relations in the cultural circuit. This is accomplished by making alterations in the reverberating circuit in two ways: by adding in the superimposed material and by

introducing the new element of the social. We shall run through the same divisions of the cultural circuit, only this time at a level of integration compelled by the new factors.

The difference between the neurophysiological and psychological circuits, on the one hand, and the cultural circuit on the other, is that in the former the tissue needs power the drives and tissue satisfactions constitute the responses and the stimulus-response mechanism and simple servomechanism are explanatory; whereas in the cultural circuit there is aim at two sorts of accomplishments: knowledge and construction. Every stimulus retains the character of a projection, and neurophysiology hooks up directly with social psychology. Superimposed higher circuits indicate connections of a transitive nature between the neurophysiological and the cultural. Culture results from the efforts of man to make the kind of world to which he would wish to accommodate himself. The adjustments of external stimuli necessary to produce the desirable responses by the organism now must be furnished by the qualities emerging from the social context. In the cultural circuit material objects and other persons are included, and the servomechanism with tuneable homeostats is the model necessary for explanation. The knowledge is knowledge about something beyond the subject, and the construction consists in artifacts, or interpersonal relations, or, as in the case of social institutions, both.

Let us assume that we are dealing with a human individual among other human individuals as well as among artifacts. Psychological patterns already exist, but strong reinforcement for some of them comes from other individuals. For this purpose, a second individual may play a dual role which he performs separately: he may be a corroborative or a combative source, or he may serve as himself an artifact. In either case, the stimulation is reinforced or weakened. The available environment for the human individual contains only other human individuals and artifacts, and they are shuffled up together in a social milieu which to be social must contain at least one of each type of element.

The corroborative stimulation from other individuals leads to belief; the combative stimulation leads (where it does not issue in overt action) to doubt. But in order to receive the impressions from other individuals which are so necessary to belief or doubt and to action, a language is required.

Languages are artifacts of a particular sort. They consist in artifacts which in the available environment indicate other artifacts and in the total environment other material objects: symbolic artifacts. A symbol is an artifactual sign, and always has a material component. A sentence in a language is a string of marks, and a string of marks can represent anything from an algebraic equation to a declaration of war. The point is that the interpersonal relations are the ones which compel the introduction of symbolic artifacts. Languages are signalling systems in use in interpersonal relations. Just as the reflex arc carries the cultural circuit, so strings of marks carry the communication of meaning. Linguistic communication functions as arousal, but arousal of a different character from what we have studied previously. It does not figure directly in the discharge of motor patterns affecting the initiating artifact but instead makes contact with more complex structures.

The reaction to external stimulation could not occur altogether on the basis of the changing elements of the external world. Some permanent elements had to be found so that there could be a stability in guidance patterns for behavior. There was needed, in short, some basis for belief, and the changing particulars of the external world proved incapable of supporting any sort of permanence of the individual material objects themselves. The stability did not

develop among the particulars disclosed to sensation but rather in the configurations disclosed to cognition. Hence recurrence was detected and the symbols to represent it invented. The world of imagination was the result. What we found earlier to be true of sensory experience itself, is true also of all symbolic expression. It is part of the inherently extended nature of language that no particular can be adequately represented except in general terms. There has to be an area for the consideration of configurations. That is the domain of cognition, of thoughts-about-particulars, which is one stage in complexity beyond awareness. Thoughts-about-particulars is awareness of awareness, but it is not yet at the level of thoughts-about-generalizations, of which more shortly.

Thoughts-about-particulars consist in internal speech commenting on the observation of strong perceptual fields. Thought is not all belief; it includes the entertainment of ideas, and the consideration of the acceptance of knowledge, and such entertainment requires doubt in addition to belief. No doubt, then no reason; no reason, then no acceptance. Belief is not voluntary but always and only for reasons—what, to the believer at least, appear to be good reasons. The type of belief is commensurate with the type of acceptance. Extreme beliefs are accepted only by means of extreme procedures. A philosophy requires a revelation.

Thoughts-about-generalizations are comments on the observations of ideational graphs. The non-specific categories which have ridden in on the first generalizations govern the conclusions concerning all subsequent ones. For instance, "poltergeist" brings with it the information that there are such things as noisy household ghosts constituting a class. "Poltergeist" itself is labelled subclass, ready to be considered on the same basis as, say, "leprechaun" and these together perhaps under "spirits."

Belief is the feeling that a proposition is true when it is conscious belief, but there is also the feeling of doubt based on conflicting material. This conflict has to be resolved in the foreground and the issue returned to the background. Doubt is self-liquidating and has a shorter life. Ordinarily, one does not believe a proposition to be true but merely believes a proposition. Belief is constructed on information emotionally charged. This is because one does not hold propositions as such but accepts the reality of that to which they refer, feeling through them, as it were, to the situations to which they point. To believe that all men are mortal does not mean to believe that "all men are mortal" is true; it means to believe that each and every man, those one actually knows as well as those one does not know, will eventually die.

The inception of belief can be due to two causes other than reason: feeling and action.

We have discussed the inception of belief under the dominance of reason. There is belief also when feeling is dominant over reason. Such an occasion would have to be one starting from a strong emotional stress or tension, similar to that which Pavlov produced in his dogs. Mass conversions, whether to a religion or to a philosophy, are usually obtained by means of two mechanisms: mass suggestibility and emotional tension. Conversion to Christianity and to communism have occurred in much the same way; for instance in the former case by Spaniards who offered the Indians of the Americas a choice of the cross or death, and in the latter case by the Chinese brainwashing of their prisoners.

The inception of belief under the dominance of action is what has long been called "learning by experience." A particular action successfully completed demonstrates the falsity of the proposition that there exists no such class of actions. Action often dramatically illustrates what cannot be done because of obstacles, and by inference what can. A burned child shuns the fire, but also a man who has synthesized a protein in the laboratory has demonstrated that proteins can be synthesized.

Many other sources of belief exist. Beliefs have been accepted because of thoughts, feelings or actions, but also on each of the following more specific grounds: analogy, authority, common sense, dreams, ego, emotion, other beliefs, forced conviction, habit, intuition, pathology, revelation, social pressure, tradition. It will be necessary for present purposes to say an additional word about two of these: other beliefs and social pressure.

Beliefs are often accepted because they are consistent with other beliefs already held. Awareness compels a need for consistency. There is pain in conflicting beliefs of which the patient is aware, and at least the discomfort of knowing that for him they are not prepared to issue in action. Beliefs consist in behavior patterns awaiting discharge, to be triggered chiefly by relevant external events. They are reinforced meanwhile by other beliefs with which they are consistent. The stronger the reinforcement the more comfortable the storage. The internal environment, the *milieu intérieur*, is disturbed by conflicting beliefs and supported by consistent ones. If a problem is entertained and several solutions present themselves, it will often be the case that the one adopted offers not the best outcome but the greatest satisfaction.

There is another form of consistency among beliefs. This is the effect on the strength of a belief in one person of the fact that the same belief is accepted by many persons. It is difficult to deny and easy to believe what others believe also. Moreover, beliefs held in common by the members of a given society are beliefs in harmonic phase: they reinforce each other through resonance. Thus it is that the human organism is not a valid isolate but relies upon cultural components, chiefly symbolic communication. The resonance of beliefs is supported by interpersonal communications involving artifactual signs: writing or speech, strings of marks or of sound-waves. In the psychological circuit there are organic needs; in the cultural circuit, the needs are replaced by composition.

When beliefs multiply, simple consistency is no longer sufficient, and a complex structure of beliefs is required in order to maintain order among them. The beliefs have somehow to be organized into a system, in which, of course, consistency remains the criterion. This system is the public retention schema.

By 'public retention schema' here is meant a system of social beliefs interpreted as rules of procedure whereby cognition is enabled on the one hand to apply its fundamental categories to sort out the data subsequently disclosed to sense experience and on the other hand to guide behavior. The primitive elements of such a system are the categories, non-specific elements of coding systems, in the sense of Bruner (5), which act as selective filters to determine how experience shall be interpreted. The experiences themselves *are* specific.

The conception of a public schema invites comparison with that of the private schema. The private schema is peculiar to a given individual; the public schema is common to all members of a given culture. The two schemata together constitute the beliefs of the individual. But there is no dead storage, as in a computer; some of the beliefs must be revised from time to time as new information is received or new relations between the bits of stored information detected. Hence the necessity for movement within the schemata.

Kant was the first to use the term *schema* (18), but as employed here it is closer to the meaning given it by Head (14) and Bartlett (2); it is however distinguished from these, also, by the emotional charge on its separate elements, by the degree of generalization of its content, and by the tightly systematic nature of its organization. Bartlett finds the origin of consciousness in the ability of the human organism to recognize its own schema, a view which goes somewhat further than the present usage. Consciousness in the

theory of the cultural circuit would be merely the doubling up of awareness, as for instance in the recognition of perception.

With the public retention schema is initiated the formalization of the process of axiom-acquisition. This is accomplished in one of two ways: either by recognizing in events the compulsion to beliefs of a critical sort, beliefs capable of serving as axioms in a system; or by recognizing among the beliefs already held those which are more important and so capable of serving as axioms for the deduction of the others. To incorporate a belief into a system of beliefs is another form of reinforcement. Beliefs gain strength from the support of other beliefs, and doubt is thereby rendered less probable. It is difficult to single out one element of a complex for possible rejection without involving other elements; the elements are stronger for being parts of a whole. Every belief radiates outward to logically proximate similar propositions. There is a disposition to believe in the truth of all propositions of the same class.

We shall see that the effect of the relation of beliefs is widespread and intense. First of all, however, it is necessary to consider the degrees of tenacity of belief. These range all the way from the most casual observations which pass through consciousness lightly without being remembered afterwards, such as passing thoughts, to those ultra-stable dispositional states which are held unconsciously in the memory but are capable of instigating visceral reactions at any time, such as metaphysical beliefs.

Beliefs tend to persist. A few degrees of strength of belief may be listed in the order of increasing intensity: a belief of which the subject is not at all sure; one into which he is prepared to inquire further; one on which he is prepared to bet money; one for which he is willing to take greater chances; one on which he could be asked to risk his life; one for which he is ready to die; one which he is incapable of denying; one of which he is unaware; one of which he cannot be made aware. Among beliefs, persistence may be counted as a function of intensity: the greater the intensity the longer the persistence.

Upon acceptance, beliefs begin to organize themselves into systems. With retention, two further developments occur which are of a far-ranging nature. The first of these is that thought appears. There is some tentative evidence that for the neurophysiologist thought has its origins in the generalizing from experience engineered by the amygdaloid mechanism (34). At the psychological level, thought may be regarded as an overdetermined response to the stimulus of symbol-acquisition and as consisting in the association and dissociation of ideas. Enough work has been done on deductive and inductive logic to render further discussion in the present connection nugatory. We are concerned here with deeper levels of retention. Mental events cannot be explained by means of deliberate and conscious processes alone. What we need to know is the mechanism of interaction, and this can be explained partly on the level of the association of ideas. Only, as a result of having been worked over by belief, the ideas are no longer simple logical propositions: they are now supercharged with qualities of feeling. How ideas affect one another qualitatively and not how the subject feels about them is what is meant by mental events. For it happens that only in the mind does the opportunity arise for the concrete interplay of abstractions. But since retention in the mind relies to some extent upon reinforcement from other minds, there must be some communication involved. Also, memory is limited and faulty; some other means must be found for recording material.

The two functions, communicating and remembering, come together in artifactual symbolic form. The shift of memory involving complex sequences of action from brain to symbolic artifact (*e.g.* sign systems in books, records, etc.) is a complex variety of human displacement behavior which has been incorporated in habit for its pragmatic value. The structure of an entity is that

which is common to every segment of its history, and such structures can be arrested historically and retained by being removed from living tissues and stored in sign relationships.

The extension of thought into further stages of complexity and its attendant intensity is made possible by the interplay of attention and symbolic artifacts. There is certainly such a thing as precognitive mentality, and thoughts do occur before there is language. Lévy-Bruhl argued that there is a precognitive mentality among primitive peoples (20). A notable example is the thoughts of very young children before the acquisition of speech, say under two years of age. Such thoughts, however, are rudimentary and simple. Children at such an age are incapable of putting many things together. But higher mentation takes place by means of language. Thought is self-reflective speech, and interior debate.

Thought is extended in another direction also. Just as there is a precognitive mentality, so there is a subconscious mentality. Thought of this variety is part of the continuous background of below-threshold nervous activity. Alternatives are compared and contrasted, and decisions made without the immediate awareness that such processes are in effect; but the entire mechanism of depth psychology depends upon them.

The final outcome of thought of whatever variety is a network of beliefs, the retention schemata. These are stored in the memory where they are available to releasing mechanisms. The function of releasing mechanisms is to connect up events with relevant beliefs. We have noted already that beliefs are propositions on which the feelings bestow a disposition to act. A set of beliefs, then, is a learned behavior pattern which by means of interaction with material objects or by means of interpersonal relations has been added to the already existing set of innate behavior patterns. The weakest beliefs are capable of firing only vague inclinations to action, and consist in convictions quite easily dispensed with, while the strongest have a compulsive character and carry an emotional charge.

Not all beliefs, of course, lead directly to action. All are prepared to do so but not all are called on by relevant events. Beliefs about individuals lead inductively to beliefs about generals, and beliefs about generals carry with them by deduction the anticipatory belief about uncountable individuals.

It often happens that the making of a connection between belief and action is unconscious, mere taxis-controlled behavior. At higher integrative levels it is of course conscious, and is called the will, a kind of rule of inference for cognition, operating between theorematic beliefs and the role of overt behavior in the field of action. The will makes possible the discharge of belief into action, an intentional response. The releasing mechanism at this level takes the form of deliberate decision. It may be triggered by beliefs when they rise to a certain level of strength, but the consequent impulse can be inhibited. A negative decision may be as effective as a positive; confronted with a relevant call, the decision not to act requires a great voluntaristic exertion. Other considerations come into play which are perhaps effective but nevertheless weaker. Character is the property of control exercised in acting (or not acting) upon a decision.

We revert at this point to the mechanism with which the analysis of the cultural circuit began, the negative feedback and the centrality of the artifact or other-person. Artifacts and other-persons are organized together in institutions. Each organism has a bias in favor of some external goal, that is the primal postulate of the theory of the cultural circuit being propounded here. The homeostatic mechanism is designed to maintain equilibrium, and the drives are to supply the balance with the necessary components. However, as goal-seeking increases, the homeostat has to be tuned to it and the balance readjusted by means of it. Thus the internal equilibrium becomes more

tenuous and has to be predicated on the drive toward some external goal. To shift the goal calls for retuning the homeostat. A tuneable homeostat means in the cultural circuit the ability to change the canon of selection whereby the self is to control how it will be altered by its own alterations. The internal organism, in other words, depends upon the continuing constructive efforts of man, the maker.

The nervous system conditions behavior of a sort responsible for the construction of artifacts. Interpersonal behavior is responsible for the construction of symbolic artifacts. In both cases, the artifacts play the leading role in the modification of behavior. Artifacts constitute the instruments which organisms have found to modify themselves according to their own designs. At the highest known integrative levels, the circuit is still active and can be observed. The mechanism of the negative feedback, operating on prepotent material, produces displacement behavior at the higher levels. For just as lower integrative levels determine higher, so higher integrative levels direct lower. An extreme example is the emotions invoked by works of art: Bach's fugues, Shakespeare's plays, Phidias' sculpture. This is what Freud recognized intuitively when he argued that the frustration of the sex drive is responsible for civilization. The displaced sex drive discharges into the production of original artifacts—tools and institutions, for example. It is precisely because he covets his neighbor's wife in vain that he builds office skyscrapers. Displacement behavior leads, in short, to releasing mechanisms capable of operating to increase control.

PSYCHOPATHOLOGY OF THE CULTURAL CIRCUIT

We next turn to the pathology of the cultural circuit. As usual it is necessary to begin with the neurophysiological and psychological circuits. It will be recalled that an equilibrium exists between organism and external goal, based on the drives: hunger at the physiological level, sex at the psychological level, and curiosity at the cultural level. Since we have been concerned chiefly with the cultural level, we confine ourselves in this connection to curiosity; the drive toward inquiry is satisfied only with manipulation: constructing an artifact or reconstructing society by participation. If the equilibrium is upset, a disturbance ensues. It can be upset by mechanisms at any of the three levels.

We have seen that genetically the psychological level is higher than the neurophysiological and also later in the evolutionary series, and the cultural level is still higher and even later. The historical development is the basis for the establishment of a norm. We begin where we left off in the study of the cultural circuit. Remembering, then, that lower integrative levels are causal for the higher levels and the higher levels directive for the lower, it should not be suprising that brain damage impairs intelligence. The plausible hypothesis has been offered that with damage to the limbic system the biased homeostats of the internal core brain stem are freed so that errors are not corrected and oscillation results, as suggested by Pribram and others (30). A good example of such oscillation is to be seen in the behavior of the typical schizophrenic, who when confronted with emotional stimuli either retreats into a state of apathy or overreacts, the generalized inhibition of movement and the extreme muscular aggression of the catatonic, for instance.

Pribram's hypothesis can be extended in several directions. If errors are not corrected, then signals from the external world can be ignored. As in studies of ablation, deficiencies as well as releasing mechanisms make their appearance. The organism is turned inward and a pathological subjectivity results. There is some reason why psychology has tended to study the organismic end of the interaction between organism and environment: there is some skewness in the normal circuit, with the concentration

bunched at the organismal end. In a pathological circuit the skewness has increased. Where equilibriums had been established to facilitate the drives, equilibrium itself now becomes stronger than the drive. In fact, the drive itself is toward the restoration of equilibrium. The result is an organism inadequately in contact with the available environment. As a result the subjectivity increases, and signals are looked for only from within the organism.

When homeostasis no longer relies upon exteroceptive stimuli, there must be other neurological symptoms. It would be interesting to know, for instance, whether in the psychotics any subtle shifts occur in sensitivity or foreground functioning from the parasympathetic to the sympathetic nervous systems, from exteroceptors to proprioceptors. Certainly such a shift would explain why all illnesses, from fractured tibia to poliomyelitis, are accompanied by psychic trauma.

Genetically speaking, the process of development from infant to adult involves the addition to the neurophysiological circuit of the psychological circuit and finally of the cultural circuit, the normal circuit of the adult. Pathology reverses genetics; it attempts to turn back the psychological clock. The pathological individual is one in whom there has been a reversion from the cultural circuit to the psychological and perhaps even in some cases to the neurophysiological. Displacement behavior makes its appearance. Motor patterns are discharged without the proper psychological goals. Orientation toward objects becomes secondary to manifest behavior, the action having taken temporal precedence, with the purpose causally fitted to it afterwards. Cues come more insistently from lower levels, but they are conflicting and confusing, and so there is an additional delay in responding to them. It is not a new story that impairment of function may be due to delayed response, and that the additional impairment may result in further disorganization.

Pathology, in a word, is subjectivity. When an individual encounters a conflict between his retention schemata and events, he refuses to give up the schemata and hence withdraws from the world of events. Issues between acting and knowing are settled in favor of knowing, but this can be accomplished only by shifting from the world in which action occurs to the one in which knowing occurs. The occasional procedure of introspection becomes the customary behavior. Learning from experience means revising the schemata in terms of new information; but now the schemata are no longer to be revised. The neurophysiological and the psychological organism continues, however, to live in a world of events. Stresses are produced upon the individual and strains result, the "catastrophic response" (12), with its inevitable pathological consequences.

There follows a breakdown in the structure of goal-seeking. Thus where becoming a normal adult had meant using the self to produce effects on the world, becoming a pathological adult now means using the self to produce effects upon the self which are detrimental; the result is the same kind of subjectivity which was originally the normal mental state of the child. This explains the resemblance in the Freudian account between the psychotic and the infantile. The external world with its material objects and interpersonal relations is shut out because the adjustments within the organism do not permit it to be faced in that direction. Instead, there is a concentration within the self. The greatest intensity of activity is taking place there, but at lower levels. Excitation at a lower level may inhibit functioning at a higher. Centrally aroused sensations become hyperactive in inhibiting the reception of stimuli. When the whole effort of which an organism is capable is devoted to homeostasis, the effects of all further stimuli take on a nociceptive character.

There is another equally strong result of

the freeing of biased homeostats. Oscillation occasions conflict. The contradictions contained in the conflicts of stored beliefs are released by the subjective concentration, and what Festinger has called "cognitive dissonance" results (8). This is the pathology of the ratiocinative stage, but it can be subconscious. Competing beliefs can lead to interference with action, inhibitory efferent impulses cancelling afferent.

A deep feeling of insecurity compels the effort at resolution, and there is no left-over attention to turn outward. Hence the subject in this state is indifferent to events around him and cannot be moved. The dependence shifts to the conflict, which then becomes necessary; and the conflict-dependent reaches an adjustment as a kind of equilibrium neurotic: stabilized on a balance involving high tension.

In addition to paralyzing action, cognitive dissonance can have other effects. It can for instance reinforce beliefs in irrational ways. Beliefs formerly held on evidence are now held for their stability effects. The inherently extended nature of experience leaves a residue of generality which has to be resolved. It cannot be supported as free-floating by the pathological personality, for it, too, challenges stability. Where stability maintained was a natural condition hardly regarded by the individual as it occurs in a supportable state furnished by the equilibrium between his drives and his goals, stability lost becomes a state very much the object of awareness and of desire. Consequently, the nearest equipment is seized upon and a synthetic equilibrium attempted. Prejudices are ready to hand where beliefs are unavailable. A prejudice is a belief held despite its conflict with another belief for which there is stronger evidence. With the equilibrium based on the balance between drive and external object interrupted, the attainment (or restoration) of equilibrium itself has become the drive. In the neurotic, equilibrium is restored by freezing beliefs in conflict, one or more of which may be prejudices in the sense defined above.

Let us return to the genetic pattern again. In the developing individual, both private and public retention schemata are constructed. We have seen that the private retention schema consists in those beliefs which result from specific and unique individual experience and that the public retention schema consists in those more organized beliefs which all the individuals in a given culture hold in common. Both are likely to be maintained in their essentials in the subconscious, stored in the memory. In a normal individual, the public retention schema takes precedence over the private; in a pathological individual the private retention schema struggles for precedence. But when the activity of the individual becomes subjective, the emotionally over-determined efforts to replace the lost equilibrium would appeal to just those elements in experience in which emotion had prevailed over reason. Public retention schemata are rationally founded; it would be possible almost to say that they are the same as the axioms of reason for individuals sharing a common culture. Private retention schemata vary from individual to individual and are emotionally founded.

The effort at ascendency of the private schema over the public schema has other serious effects. Among these are compulsive behavior and emotional acceptance of the public schema.

There is nothing wrong *per se* with what is called obsessive or compulsive behavior. The fear of conscience in what Freud called the compulsive type of individual is only the substitution of a subjective element (conscience) for an objective element (the love object). Compulsive behavior is not regarded as over-determined when the goal is a socially-approved and accepted element of the public schemata. What is wrong—when it is wrong—is the type of element, which has become a subjective one. We have

named two such elements: an equilibrium of prejudices, and the conscience. Compulsive behavior, in short, is only pathological when it is based on a drive toward some pathological object, such as the two just enumerated.

The emotional acceptance of public schema may involve the immediate and absolute acceptance of entire systems of ideas at some deep level where they can hardly be challenged. The type of belief in such cases is commensurate with the types of acceptance. For instance, absolute beliefs are adopted under conditions of extreme emotional stress. Sargant has studied this phenomenon (32). He draws a parallel between the shock induced in Pavlov's dogs, religious conversions, and the "brain-washing" of the Chinese communists.

The familiar pathological divisions may be looked at from this perspective. The neurotic is one in whom the conflict between private and public retention schemata has become active. The private schema has challenged the public schema. The struggle has caused a partial withdrawal from external preoccupations; that is why there are often emotional disturbances in such cases, "unfocused anxiety," for instance. The emotions are not unfocused; they are focused on an internal object. There is a substitute equilibrium established between mutually exclusive drives or between appetite and aversion. The anxiety neurotic makes no decision. He is transfixed by an unresolvable conflict, caught in a closed loop, and can only go round and round with it. He is not compulsive, he is enmeshed. There is no refusal to adapt, only an inability.

The psychotic is one in whom the conflict between the private and public schemata has been settled, only the private schema has prevailed over the public schema. The schizophrenic suffers from schematic disorganization, with the dominance of the private schema. The manic depressive suffers from rigid determination by the private schema. The withdrawal from the external world is now complete; there is no more correspondence with reality. Private retention schemata are no longer called upon to withstand the shock of the discovery that they contain beliefs incorporating false propositions. Consistency is still required on which to rest a sense of reality. But the sense of reality can now be satisfied internally. The internal world is the real world for the psychotic, and if he is concerned with the external world at all it is only because he has incorporated it in his own world. He is occupied with maintaining an all-embracing solipsism.

Defects in the cultural circuit may be responsible also for pathological conditions. We have already noted that artifacts often behave in ways not expected or required by their originators but determined instead by their own organization. These may have pathological effects. It is particularly true at the cultural level, when, for instance, occupational diseases assume neurotic proportions.

It may be that in the pathological individual we have the situation of normal sets of inhibitions run wild. It is possible that controls may themselves be inhibited, with irrational behavior as a result. Neurological lesions give rise to the defective display of intentions, and the corresponding reactions represent disorganized actions. Randomization in such a case is equivalent to disorganization. Once more there is a reversion to the primitive chance signals of the infantile nervous system.

Not all pathological conditions are accidental and involuntary, however. Men have succeeded in inventing artifacts which stimulate them to abnormal states. Institutions, such as religion and art, embody rituals and artifacts which produce excessive emotions. Drugs, such as alcohol, opium, mescaline and lysergic acid, have similar effects. The necessity for the abnormal is not very well understood, and hence the bound-

aries of the pathological are confused. It may be that what is called normal in the human rhythm is the crest of a large wave in which the "abnormal" plays a conventional and necessary part as the trough. The pattern may be one of extend-and-adjust rather than of simple maintenance requiring tensions within tolerable limits. The pathological individual is one in whom extension or adjustment is a fixed and frozen state. Examples would be: the homicidally inclined paranoid, for extension; and the catatonic schizophrenic, for adjustment. Both ends of the normal rhythm have been pushed to pathological extremes. Actually, a variation is more normal than a persistent condition. It is the fixed personality which exhibits pathological tendencies. The paranoids who think they are Napoleon fall into a familiar pattern. For this reason they are not individually interesting; they concern the therapist intellectually only as a type. More interesting to him would be the mind of Napoleon, of which there has been only one.

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CONDITIONED RESPONSES IN THE GAMMA EFFERENT SYSTEM

JENNIFER S. BUCHWALD, PH.D.[1] AND EARL ELDRED, M.D.

INTRODUCTION

Motor performance is greatly influenced by the system of small efferent fibers innervating muscle spindles. These "gamma efferents" govern contraction of the intrafusal muscle fibers around which the sensory endings of the spindles are wrapped, and thus serve to modulate the afferent inflow from the muscle. In turn, the large alpha motoneurons responsible for contractions of the gross muscle are susceptible to facilitatory and inhibitory influences from this afferent inflow. Although the presence of intact circuits through the spindles is not requisite for excitation of alpha motoneurons and movement to occur, interruption of these circuits leads to marked elevation of threshold for alpha motoneuron responses (4).

In several types of reflexes and during stimulation of the brain alterations in activity of gamma efferents are induced by stimuli inadequate to affect alpha motoneurons (4, 8). Since this tonic and more sensitive activity in the gamma efferent system provides a substrate out of which overt movements of the animal arise, one might anticipate that the gamma system is actively involved during learning of motor responses. Specifically, the appearance of overt conditioned movements may be presaged by a pattern of conditioning involving gamma efferent pathways.

We have investigated changes in the gamma efferent system during the procedure of conditioning to tone (CS) paired with shock to the paw (US). Available techniques for recording gamma efferent activity necessitated the use of acute immobilized preparations. Conditioned acceleration of gamma fiber discharge was obtained as early as the fifth conditioning trial, many trials before behavioral conditioned responses are known to occur.

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METHODS

Experiments were performed acutely on adult cats. Ether anesthesia was used during the surgical procedure and the animals were maintained on gallamine triethiodide (Flaxedil, American Cyanamid Co.) during experimentation. Routinely tracheal and venous cannulae were inserted and the lower lumbar cord exposed. Following surgery, the animal was suspended in a hammock and wound edges were thoroughly and repeatedly infused with procaine. Temperature of the animal was maintained by a heater below the hammock and by a lamp over the oil pool formed around the spinal cord. The pool temperature was held at 37–38°. The laboratory was kept darkened and quiet.

Ventral roots L6 or L7 were sectioned at their exit through the dura while the animal was under ether. Splitting the roots to isolate a gamma efferent unit and recording did not begin until the animal had been artificially ventilated for an hour. The tonic, low amplitude discharge of gamma efferent fibers was easily distinguishable from the high amplitude bursts of alpha fibers (9).

In habituation studies, tones of 1000 c/sec, 1.5–3.0 sec duration were generated by a Hewlett-Packard audio-oscillator and delivered through a speaker 10 inches in front of the animal's head. The same tone was used as a conditioning stimulus. The unconditioned stimulus, which overlapped the conditioning stimulus, was a 0.5 sec train of 60/sec square-wave pulses of 1 msec duration delivered by electrodes inserted

between the toes of the hind paw on the side of the sectioned ventral roots. Prior to Flaxedil injection this stimulus was adjusted to a strength 1–2 volts above that required to induce leg flexion. Thus, the unconditioned stimulus was always adequate for the development of conditioned responses in alpha fibers. A stimulus of this strength, when applied to the fingers of the investigator, produced a prickly, tingling sensation which caused involuntary withdrawal. The sensation was unpleasant but not painful. Intervals between trials were two to three minutes.

RESULTS

HABITUATION OF GAMMA EFFERENT RESPONSES

Presentation of a tone stimulus to the paralyzed cat maintained in a quiet, darkened environment frequently causes temporary alterations in gamma efferent activity. These changes, either slowing or acceleration of the rate of discharge, gradually diminish and eventually disappear upon repeated presentation of the stimulus. In the experiment of Figure 1, slowing of gamma efferent discharge occurred in response to a 1000 c/sec tone of 2 seconds duration. During each of the first 20 presentations, made at three-minute intervals, the discharge stopped completely (A), but on subsequent trials the degree of slowing diminished progressively (B, C). By the 51st trial all response to the tone had disappeared (D). Recordings from the sensorimotor cortex showed low voltage, fast activity throughout the habituation procedure.

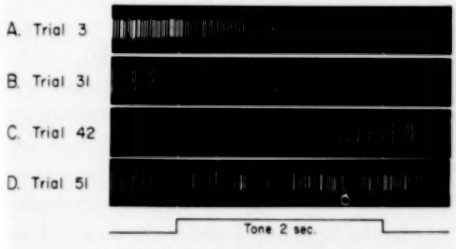

FIG. 1. Habituation of gamma efferent response to tone. A 1000 c/sec tone of 2 sec duration was presented at 3 min intervals. Tone "on" and "off" are indicated by marks at bottom of each tracing. Early trials (A) show cessation of discharge during and after presentation of tone. Trials 31 (B) and 42 (C) show progressive diminution in response. On 51st trial (D) no response occurs.

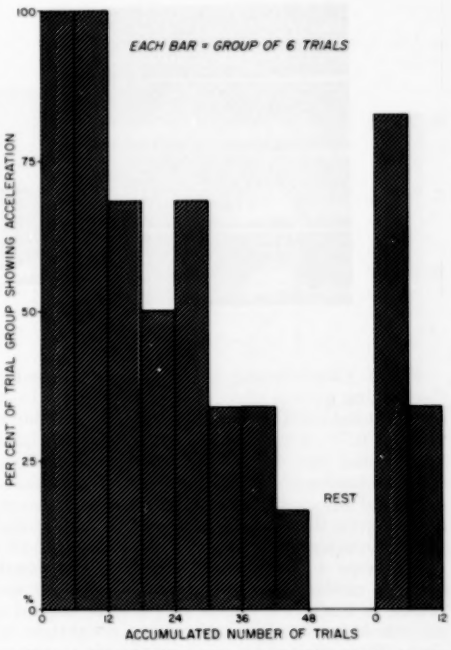

FIG. 2. Habitation of gamma efferent response to tone. A 1000 c/sec tone of 1.5 sec duration was presented at 1 min intervals. Height of each bar represents the per cent of acceleratory responses in a group of six trials. A response was present if the discharge during the first second following the tone exceeded the discharge during the second preceding the tone by five or more impulses. During the first 48 trials incidence of responses gradually decreased. After a 15-minute rest, responses returned but habituated rapidly.

Similar habituation of an acceleratory response is illustrated in Figure 2. The height of each bar represents the percentage of responses obtained in a group of six consecutive trials. It may be seen that the gamma efferent discharge accelerated in response to all of the first 12 stimuli. Thereafter, the unit became less responsive and only two of the 42nd to 48th trials elicited feeble acceleration. Following a 15-minute

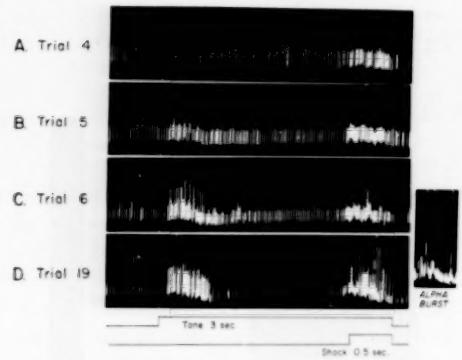

FIG. 3. Conditioning a response in tonically discharging gamma efferent fiber. 1000 c/sec tone of 3 sec duration (CS) was paired with 0.5 sec shock train of 6.7V, 1 msec pulses, 60/sec, to the ipsilateral hind paw (US). Line diagrams at bottom indicate timing of stimuli for the tracings above. Intertrial interval 3 min. Conditioning was not apparent on the 1st to 4th trials (A), but conditioned acceleration was seen in the 5th trial (B) and became marked on the 6th (C). Additional spike of moderate height giving conditioned response in tracings C and D may also be that of a gamma fiber (3). By comparison, potentials of alpha fibers elicited by pinching the toe extended off the oscilloscope face (insert to right).

rest period, the gamma unit was again sensitive to the tone and the first five trials elicited acceleratory responses. Habituation, however, occurred much more rapidly than previously and only two of the 6th to 12th presentations elicited responses.

CONDITIONED RESPONSES IN THE GAMMA EFFERENT SYSTEM

From a group of 11 experimental animals, conditioned gamma efferent responses have been obtained in seven. Three of the remaining animals showed questionable responses and in one, no response was elicited. It is believed that the condition of the animal is crucial to the success of the experiments. As the necessary use of Flaxedil during the conditioning procedure decreases muscle afferent inflow, a large source of excitation is removed from the central nervous system. If additional depression occurs through a drop of blood pressure, anoxia, etc., the threshold of gamma efferent excitation may become too high for either central reflex or conditioned response activation. The animals used in these experiments showed gamma efferent responsiveness in pinna and neck reflexes.

Conditioning in the gamma efferent system was established by pairing a tone (CS) with an overlapping shock (US) to the hind paw. The gamma efferent fibers used were either unresponsive to the tone initially or were habituated to the tone before the conditioning procedure was begun. Gamma fibers accelerating to the US were most plentiful in L_6VR. The discharge of occasional units in L_7VR was slowed by the US. In a defensive withdrawal reflex it might be expected that the discharge of gamma fibers leading to flexor muscles would accelerate, while the discharge to extensors would become slower.

In the experiment of Figure 3 a gamma efferent unit was isolated which fired more slowly with presentation of the 1000 c/sec tone alone. The tone was repeated until the unit no longer gave a response. When the tone was then paired with the US, no response to the tone (CS) occurred during the first four trials, although there was acceleration during the US (A). On the fifth trial acceleration appeared with the onset of the CS (B). This acceleration to the tone was marked upon the 6th CS-US trial (C) and additional units, probably also gamma fibers, appeared to be conditioned. The acceleratory response of the initial gamma fiber continued through as many as 19 trials and gradually shortened in duration (D).

Gamma efferent responses occurred specifically to the tone used for conditioning and presentation of a tone of different frequency was ineffective. In one preparation a gamma fiber that was initially unresponsive to the tone developed a conditioned acceleratory response from the 10th to 26th presentation of paired CS-US. This first unit was lost and after 30 minutes a second fiber was isolated. The new fiber showed initial acceleratory responses to the CS, which were extinguished in 12 trials (Figures 4 & 5). Subsequent pairing of the CS with

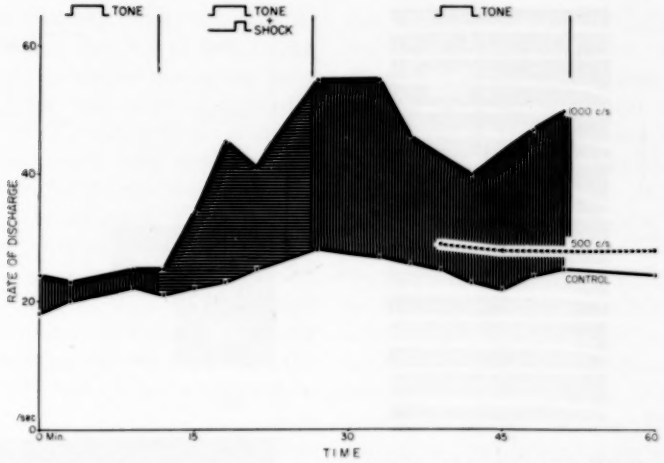

FIG. 4. Reconditioning of gamma-efferent response and its selectivity to CS. The line labeled "control" is drawn between points representing rate of gamma fiber discharge during the second preceding CS. Points along "1000 c/s" curve give rates during first second of CS; those along "500 c/s" line, rates during a neutral 500 c/sec tone. Decibel intensity was the same for both tones. Other trials made at six, 24 and 30 minutes were not photographed but gave consistent results.

Left-hand portion of graph shows that the conditioned response which was present earlier has been extinguished. Middle portion demonstrates rapid return of acceleratory response to CS when reinforced with US (10V, 1.5 msec, 60/sec). Right-hand portion shows that response subsequently occurred to the CS alone but not to a neutral 500 c/sec tone.

the US produced in the third to fifth trials marked acceleration to the CS. Marked acceleration was then obtained on each of four trials with the 1000 c/sec CS alone. Three minutes later, at the time for the next trial, a tone of 500 c/sec was presented. Essentially no response occurred to this new tone. Trial subsequently with the conditioning 1000 c/sec tone was still effective. Demonstration of this selectivity in response could be repeated. A third unit was then isolated which accelerated with the first presentation of the CS. Selectivity of this response was tested by random presentation of the CS and the neutral, 500 c/sec tone. Every presentation of the CS elicited a response, while interspersed trials of 500 c/sec tone were ineffective (Figure 6). Experiments are now in progress to determine gamma efferent discrimination-generalization responses to tone frequencies above and below the conditioned stimulus frequency.

Two points are brought out by this experiment: 1) the conditioning established in the first gamma fiber extended to other

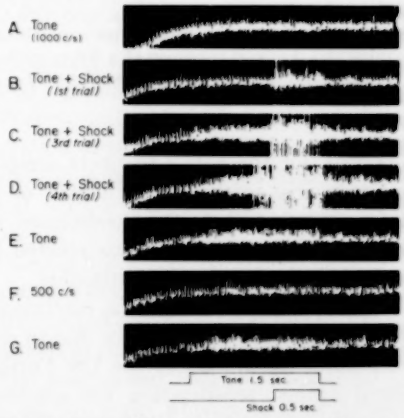

FIG. 5. Reconditioning of gamma efferent response (graphed in Figure 4). Conditioned response of this fiber to CS had been extinguished in the course of 12 trials without reinforcement. The last of the extinguishing trials is illustrated in A. Conditioned acceleration rapidly returns after trials with CS-US (B, C, D). Subsequent presentations of the CS (E, G) produce gamma acceleration which is lacking when a neutral 500 c/sec tone is presented (F). Bursts of high-amplitude alpha motoneuron potentials appear during the US in B and C and slightly precede the US in D. No alpha discharge, however, occurred upon subsequent trials with the CS alone (E, G).

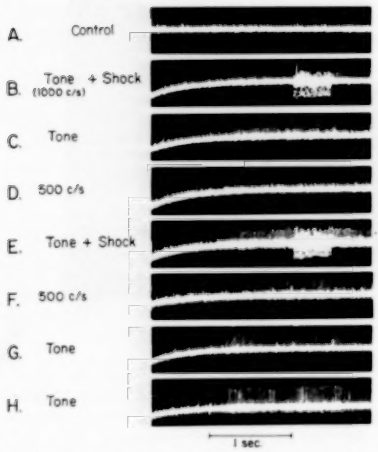

FIG. 6. Extension of conditioning to additional gamma units and selectivity to CS. Gamma fiber isolated immediately after trials illustrated in Figures 4 and 5. Trials B through H made at 3 min intervals; "on" of 1.5 sec duration tone indicated by marker at the bottom of each trace. Tonic discharge of fiber in absence of stimuli is shown in A. On first trial, unit accelerates to CS prior to onset of US (B), showing effect of previous conditioning. The 1000 c/sec CS alone elicits a good response (C), but 500 c/sec tone is essentially without effect (D). Upon following trial with CS-US strong response precedes the reinforcing stimulus (E). Lack of response to a 500 c/sec tone (F), followed by excellent responses to 1000 c/sec CS (G, H) is shown again.

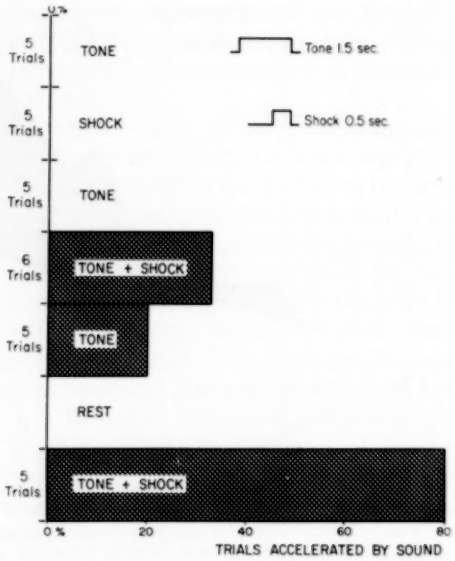

FIG. 7. Conditioning procedure controlled for sensitization by US. Tone of 1000 c/sec and 1.5 sec duration used as CS and a 0.5 sec shock train to ipsilateral hind paw used as US. Trials in sequence at 3 min intervals. Five trials with CS alone produced no response. Five trials with the US were then given. Subsequently, five trials with CS were still ineffective, showing that sensitization to the US had not occurred. When, however, CS was paired with US for 6 trials, a conditioned response developed and was present thereafter with CS alone. Retention of this conditioning over a 15-minute rest period was shown by the occurrence of four responses in next series of five CS-US trials.

units also, for the next two fibers sampled gave responses to the CS with little or no reinforcement; and 2) the conditioned response was selective, for it was elicited by the CS but not by a neutral stimulus.

The selectivity of the gamma conditioned response indicates that it is not due to sensitization of the animal by the US. Further control against sensitization was obtained by presenting a series of unpaired CS and US in alternation. In the experiment illustrated by Figure 7, five presentations of tone alone produced no response in gamma efferent activity. The US was then given for five consecutive trials. Subsequently, five trials with tone alone were run, and in none of these trials did a response to the CS occur. This lack of response indicates that stimulation of the paw had not sensitized the gamma unit to the CS. When the CS was next paired with the US, a response to the CS developed which could subsequently be elicited by the CS alone. After a 15-minute rest period, this response to the CS was still present.

Most of the filaments used in observations on gamma unit activity contained alpha motor fibers which discharged during the US. The unreinforced CS, however, elicited conditioned responses only in gamma fibers; accompanying alpha fiber conditioned discharge was not present.

DISCUSSION

The response developed in the gamma efferent system by pairing tone with shock

is believed to represent true conditioning, as: 1) the response was not present before CS-US pairings, developed during the pairing of CS and US, and could subsequently be elicited by the CS alone; 2) the response could be extinguished and then brought back with fewer CS-US trials than were originally required to establish it; 3) the response occurred with presentation of the CS but was not evoked by a tone of different frequency; and 4) presentations of unpaired CS and US in alternating sequence produced no response, whereas pairing CS-US for the same number of trials evoked a response to the CS.

The development of conditioned gamma efferent responses after as few as five CS-US presentations is in sharp contrast to the conditioning of hind leg flexion to tone, which may require more than 100 trials to become established (1). In accord with this, conditioned responses of alpha fibers were never observed in the number of trials possible with the present technique. More closely related in time to gamma conditioning is the conditioning of cortical and subcortical areas. Cortical conditioned responses to tone paired with shock to the paw or chest may appear within 10 trials (1, 5).

A conditioned change in cortical activity might itself result in a response in the gamma efferent system, since stimulation of the cortex readily influences muscle spindle activity (6). However, as alterations in gamma discharge can occur independently of cortical activity (2), the gamma conditioned responses may be more related to conditioned changes in subcortical structures. The reticular formation, which develops conditioned responses earlier than the cortex (10), has direct and extensive connections with the gamma system (7). Through such connections conditioned changes of the reticular formation could be imposed on gamma fibers at spinal levels.

The sensitivity of the gamma efferent system to conditioning procedures suggests that this system may actively aid in the learning of motor responses. The ultimate effect of gamma conditioning would be a gradual elevation in ventral horn cell activity due to the continued firing of the gamma system by the conditioning stimulus. At the cord level, the development of gamma fiber-spindle afferent conditioned activity might be expected to increase excitation of the ventral horn cells directly. At the same time, the conditioned afferent inflow projecting upward to the brain would facilitate or reinforce conditioning in supraspinal centers. Such spinal and supraspinal activation by the gamma efferent system during the trials preceding an overt response may be of active and important assistance to conditioned learning.

SUMMARY

The role of the gamma efferent system in learned behavior was studied in acute experiments on cats immobilized by Flaxedil. Recordings of gamma efferent activity in L6 or L7 ventral roots were made during conditioning trials in which tone (CS) was paired with shock to the hind paw (US).

Tone stimuli alone frequently caused acceleration or slowing of gamma efferent discharge. This gamma response could be habituated with repeated presentations of the tone.

Gamma fibers unresponsive or habituated to the tone developed a conditioned response of accelerated discharge after five to 10 presentations of the paired CS-US.

The conditioned response evoked by the CS did not occur when a tone of different frequency was presented, nor did the response occur when CS and US were presented alternately in unpaired sequence.

The significance of gamma efferent conditioned responses as a substrate of behavioral conditioning is discussed.

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SOCIOPSYCHOLOGICAL CHARACTERISTICS OF PATIENTS WHO REFUSE CONVULSIVE THERAPY

MAX POLLACK, PH.D.[1] AND MAX FINK, M.D.

The growing recognition of the relation of social factors to referral for and response to somatotherapy in psychiatric treatment has stimulated increased study of "drop-outs"—patients who refuse to start or to continue treatment. Although the problem of "drop-outs" is a major one in somatotherapy, it has received little attention. In convulsive therapy it is considered one of the most frequent "complications" of treatment (1) yet it is infrequently discussed (3, 7) and no systematic studies have been devoted to it.

Systematic studies of "drop-outs" have been limited for the most part to patients in psychotherapy in out-patient facilities (4, 5, 9, 19, 20). These studies have consistently shown marked differences in social and psychological characteristics of patients who remain in psychotherapy and those who fail to continue. Those patients who remain in therapy have more years of education and are of higher social class than those who leave. In addition, their social attitudes, as measured by the California F Scale, show "less so-called conventionalism, stereotypy and less of an uncompromising insistence that 'right' and 'wrong' can be distinguished" (20).

In sociopsychologic studies of the patient population of Hillside Hospital (12, 13) age, education, place of birth and degree of stereotypy, as measured by the F Scale, were related to selection for, and response to, convulsive therapy. Those patients who were older, had fewer years of education, were foreign-born and who manifested high scores on the F Scale were most likely to receive convulsive therapy, be hospitalized for a shorter period, and be rated as improved at time of discharge. In contrast, patients who were younger, better educated, native-born and who obtained low scores on the F Scale, most often received psychotherapy as their sole form of treatment, were hospitalized for a longer time, and were more likely to be discharged with a rating of unimproved. Thus, the determination of psychiatric treatment was viewed as an interactive process, and related to the background, cultural values and communicative pattern of *both* therapist and patient.

In view of this relation of psychosocial factors to selection for and response to treatment, it was postulated that in a psychotherapeutically-oriented hospital patients who refuse or fail to complete convulsive therapy would be significantly younger, better educated, and be less stereotyped and conventional than patients who completed a course of therapy. This study was undertaken to test this hypothesis.

PROCEDURE

The seventy-five consecutive in-patients (27 males and 48 females) referred for convulsive therapy at Hillside Hospital during the one year period from October 1, 1957 to September 30, 1958 were included in this study. Hillside Hospital is a non-profit institution for the treatment of voluntary patients. Psychoanalytically-oriented psychotherapy is regarded as the primary method of treatment, with various somatotherapies available when necessary. All patients are seen for individual psychotherapy three times a week, with psychotherapy continuing when other treatment, *e.g.*, convulsive therapy, is administered.

Three social (age, education and nativity) and one psychological measure (the Cali-

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fornia F Scale), were employed. A ten-item modification of the F Scale (6, 14) was administered to 53 referrals prior to treatment. In this task, the subject reads 10 statements and indicates whether he agrees or disagrees with each statement, and to what extent. The score given for each item ranges from one to seven and the range of total scores is ten to seventy. The greater the subject's agreement, with the statement, the higher the score obtained. The statements themselves are extreme, conventional and stereotyped expressions. For example, one statement is, "If people would talk less and work more, everybody would be better off."

Patients were referred for convulsive therapy by the psychiatric resident with the approval, frequently at the suggestion, of his supervisor. The referral form requesting treatment was sent to the psychiatrist in charge of the convulsive therapy unit for medical examination and the institution of treatment. Thus, it was possible to determine those patients who were referred for treatment but who refused to start. Convulsive therapy was generally administered three times a week, and grand mal convulsions were induced with the standard Medcraft alternating current instrument.

RESULTS

Of the 75 referrals for convulsive therapy, 13 refused treatment. Of these, seven failed to start and six refused to continue treatment. In the latter group, the number of treatments ranged from three to eight—short of the generally prescribed course of at least twelve treatments.

TABLE 1

Mean Age, Education and F Score by Group

Group	*N*	Age (Years)	Education (Years)	F Score
Acceptance	62	40.3	11.6	48.7
Refusal	13	29.7	13.7	37.7
Mean Difference		−10.6	+2.1	−10.0
(One-tailed *t* test)		2.5	1.9	2.2
$p <$		.01	.025	.025

Social and Psychologic Factors: The group of patients who accepted a full course of convulsive therapy was significantly older, less educated and manifested a higher mean F score than the group that refused treatment (Table 1). Furthermore, 37 per cent of the acceptance group were foreign-born as compared to eight per cent of the refusal group. While there was considerable overlap between groups with respect to these factors, the refusal group was more homogeneous than the acceptance group. Thus, there were no patients in the refusal group who had less than ten years of education (69 per cent of the group had attended college) and none were over fifty years of age. In contrast, 27 per cent of the acceptance group never went beyond grade school (eight years or less) and 31 per cent were fifty years or older.

Differences in occupation between groups paralleled the differences in education. Thus, none of the patients in the refusal group were unskilled or manual workers. They were in clerical, professional and business vocations, whereas ten subjects in the acceptance group were unskilled workers. Housewives were excluded from this tabulation.

Relation to Diagnosis: The discharge diagnoses of seventy-three patients fell into four major categories: psychoneurosis, schizophrenia, manic-depressive, or involutional psychoses. Two patients were classified as "psychotic depression" without further specification. Although there was no statistically significant difference in diagnostic composition between the group accepting and those refusing treatment, the groups were dissimilar with respect to the incidence of the involutional psychoses (Table 2). No patient in the refusal group was discharged with a diagnosis of involutional psychosis, whereas 24 per cent of the acceptance group were so diagnosed. There was also a high positive correlation between this diagnosis and the sociopsychological factors studied. Thus, the mean age (56.7 years) and F score (61.4) were higher while the years of educa-

tion (9.2 years) was lower than that for the total refusal group (Table 1).

Relation to Improvement Ratings: At the discharge conference held by the Medical Director each patient is assigned one of four improvement ratings: recovered, much improved, improved or unimproved. The incidence of recovered and much improved ratings was significantly lower in the refusal group (Table 3). Six patients, all in the acceptance group, were rated as recovered. The hospital discharges were more closely associated with refusal or discontinuation of treatment in the refusal group.

TABLE 2

Discharge Diagnosis by Group

Group	Psychoneurosis	Schizophrenia	Manic Depressive Psychosis	Involutional Psychosis
Acceptance	7 (11%)	25 (40%)	13 (21%)	15 (24%)
Refusal	2 (15%)	7 (54%)	4 (31%)	0 (0)

$\chi^2 = 2.28$, p = n.s.

TABLE 3

Discharge Improvement Ratings by Group

Group	Recovered—Much Improved	Improved	Unimproved
Acceptance	34 (55%)	19 (31%)	9 (15%)
Refusal	3 (23%)	5 (38%)	5 (38%)

$\chi^2 = 6.41$, $p = .05$

DISCUSSION

The present study confirms and extends previous findings in this laboratory (2, 12, 13) in demonstrating the importance of social factors and their psychological correlates in the selection for and response to psychiatric treatment. It supports the hypothesis that in a psychoanalytically-oriented hospital patients who refuse convulsive therapy would more closely resemble those who remain in psychotherapy and differ from those who are selected for and treated with convulsive therapy.

The lower F scores in the refusal group than in the acceptance group are correlated with a less compliant attitude toward authority and a more analytic approach in interpersonal activities. Review of the patients' hospital records revealed that negativism, belligerence, uncooperativeness and attempts to manipulate the staff were more common in the refusal group. For example, 38 per cent of the refusal group as compared with only 17 per cent of the acceptance group formally petitioned the Medical Director for discharge from the hospital. (Almost all these patients withdrew their request for discharge shortly after the initial request). Referral for convulsive treatment was more often associated with problems of management, *e.g.*, disturbing the ward or eloping from the hospital, than for depressive or confused thinking. In contrast, a higher percentage of the acceptance group were referred for convulsive therapy for alleviation of depressive symptoms.

There is increasing evidence that acceptance or rejection of psychiatric treatment is related to learned attitudes toward treatment by both patients and therapist (8, 9, 16, 17, 21). Most often these attitudes which correlate with socio-economic status are formed far in advance of treatment, and are most likely an intrinsic part of the person's repertoire of behavior. Thus, patients from lower class backgrounds more frequently view psychiatric treatment as nonverbal and in physical terms whereas typically "the middle class patient is predisposed toward the acceptance of psychotherapy even before he arrives at the clinic" (9).

In the sample studied there were many expressions of a negative attitude toward convulsive therapy long before the referral for convulsive therapy had been made. One patient, in treatment for several years prior to her current hospital admission, terminated treatment and transferred to another psychiatrist on each occasion when convulsive therapy was recommended. Another patient asked to sign the voluntary certification form on admission, appended the following note. "P.S., If I am given shock treatment

I'll either kill myself or leave the hospital." Other patients, particularly those who have been in individual psychotherapy prior to hospital admission, state that their previous therapists instructed them not to submit to convulsive therapy in that it would be harmful.

Perhaps more important than either attitude of the patient or the psychiatrist is the factor of consistency of attitudes. Klerman *et al.*, (17) have reported that young resident psychiatrists with psychoanalytic orientations frequently have unfavorable attitudes toward somatic therapy and are ambivalent about prescribing such treatment. In the present study there were many indications that referral for convulsive therapy was not the "free" choice of the resident physician but was made only after considerable pressure by administrative and nursing personnel.

A recent study by Kaplan and Lefkowits (15) of staff and environmental factors associated with referral for drug therapy in this hospital demonstrated that the psychiatrist's tolerance for disturbed behavior was much higher than that of nurses and other personnel. Frequently the resident physician placed a premium on helping the patient modify his behavior without resort to somatotherapy. A similar observation was made by Sabshin and Ramot (21) and by Klerman (17) who found that "psychiatrists treating a patient with psychotherapy were unusually reluctant to add drug therapy." Such attitudes may be conveyed to patients either overtly or covertly. Such observations reinforce the findings of Pasamanick, Dinitz and Lefton (18) that "despite protestations by clinicians that their reference is always the individual patient, clinicians, in fact may be so overly committed to a particular psychiatric school of thought, that the patient's diagnosis and treatment is largely predetermined."

The studies here would suggest that the psychiatrist's ambivalent attitude toward treatment is not a general attitude but is related to the "social distance" of the patient to himself. The psychiatric resident frequently has less difficulty in recommending somatotherapy for a lower class patient but is indecisive when it comes to making a similar treatment referral for a patient who is culturally more like himself.

The findings that objectors to convulsive therapy were more often discharged from the hospital as clinically unimproved is consistent with previous observations (7). Gordon (7) classified objectors into two categories—poorly oriented catatonic subjects who offered resistance to the treatment and responded with clinical improvement; and a better oriented group who objected to treatment on an attitudinal basis claiming they were "not in need of them." This latter group were refractory to the clinical benefits of the treatment. Almost all of the patients in the refusal group of the present study could be classified in the latter group.

It is of interest that most of the patients who refused convulsive treatment were prognostically poor selectees for convulsive treatment. In previous studies (2, 10, 11) we have shown that the incidence of ratings of improvement at discharge in young, well-educated, low F score patients was significantly lower than in the older, less educated, more stereotyped patients. The refusal group is part of that group of patients who are neither "ideal" patients for convulsive treatment nor are they very responsive to milieu treatment and psychotherapy.

While referral for convulsive therapy in this and other hospitals has been markedly reduced within the past few years, the problems associated with attitude toward treatment, of which treatment refusal is but one aspect, are of persistent importance. In the absence of specific therapies for the majority of psychiatric disorders the further study of decision-making in psychiatric treatment may help delineate the forces associated with selection of therapy.

SUMMARY

As part of a continuing investigation of the relation of sociopsychological factors to psychiatric treatment, the present study was concerned with the sociopsychological characteristics of patients who refused to start or to continue convulsive therapy. Thirteen of the 75 consecutive voluntary patients referred for convulsive therapy refused treatment during a one year period in a psychoanalytically-oriented institution.

These patients were younger, better educated and had lower scores on the California F Scale than the group that accepted convulsive therapy. The diagnosis of involutional psychosis was absent in the refusal group, and patients in the refusal group were more often discharged as unimproved.

The acceptance or rejection of psychiatric treatment is discussed in terms of learned attitudes toward psychiatric treatment by both patient and doctor.

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GROUP THERAPY OF INCARCERATED SEXUAL DEVIANTS

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The treatment and rehabilitation of the incarcerated sexual offender is a responsibility presently assigned to psychiatry by the law courts with increasing frequency. A double challenge is presented: the overwhelmingly large number of patients and the recalcitrance of the individual patient. The number of patients requiring treatment calls for more basic research in psychiatric economy; that is, psychiatrists must continue to develop techniques of treatment which provide lasting results in large numbers of patients with the greatest possible conservation of professional manpower. In addition, more accurate methods are needed to predict which patients will respond to a treatment, which, when once undertaken, is lengthy and costly. Dynamic group psychotherapy presents a realistic approach to this problem, for it is a medium which treats large numbers of patients and yet has the potential to effect lasting attitudinal changes.

The committed sexual offender is a notoriously poor candidate for therapy (2, 5). Although periodically appearing articles (3, 6, 7, 12–15) report successful treatment of sexual deviants, these reports by and large deal with voluntary outpatients and leave untouched the far more crucial problem of the incarcerated sexual offender and those specialized techniques germane to his therapy.

The present article stems from a year's work of dynamic group psychotherapy with a group of seriously ill sexual offenders at the Patuxent Institution in Jessup, Maryland. This institution is neither a hospital nor a prison but attempts to combine the best features of each. It has been in operation since 1955 and was provided for in the defective delinquent law passed by the state of Maryland in 1951 (1). In Maryland adult males who show ". . . persistent, aggravated antisocial or criminal behavior . . . and who are found to have either intellectual deficiency or emotional unbalance or both, may, after recommendation by the professional psychiatric staff, be committed to the Patuxent Institution," just as psychotics are committed to a psychiatric hospital. These offenders are given an indeterminate sentence and remain at Patuxent until the psychiatric staff considers them to have undergone sufficient personality change to make a repetition of their criminal activities highly unlikely, at which time they are paroled and meet weekly in group sessions with one of the professional staff. The staff, headed by Doctor Harold M. Boslow, consists of other psychiatrists, psychologists, social workers and the custodial force.

As a member of the psychiatric staff, the writer formed a group of eight inmates with the only criterion for selection being the existence of a sexual offense. No other criterion was used, and the first eight inmates interviewed were accepted for the group. It is, incidentally, of interest to note that another group of deviants not discussed in this article was formed, using the additional criterion of the existence of neurotic anxiety. To form this second group at least 50 per cent of the deviants interviewed were rejected.

The age range of group members was from 21–40. The I.Q. range was 82–135. There were seven white members and one Negro. Only one had been in treatment previously (S.H.). Six of the eight had been in prison previously and the other two had received Dishonorable Discharges from the military service. There was one alcoholic (S.A.).

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Only one patient (S.H.) had graduated from high school, although several others were pursuing an education in the institution. The patients' sexual education, incidently, appeared adequate, there being no lacunae in their knowledge or unusual misconceptions about sexual matters, genital anatomy, reproduction, or childbirth. When the offender was committed to Patuxent, the original temporal sentence was suspended and replaced by an indeterminate sentence.

*E. D.*is a 28-year-old Negro patient whose original sentence was 18 months for coercing his six-year-old daughter to perform fellatio on him on many occasions. At present, he has been in Patuxent for two years. This was his first criminal offense, although at the time of arrest he was in possession of obscene pictures and had received a Dishonorable Discharge from the service for repeated bouts of venereal disease. Although he is the only member unwilling to reveal the nature of his offense to the group, he has been an active member, exploring the psychopathology in his marriage and in his interpersonal relationships in the institution. I.Q. is 105. His group behavior is alternately deceptive, sincere, obsequious, and enraged.

D.U. is a 26-year-old, white, married patient who was sentenced to eighteen months for molesting an 18-year-old girl. He has been in the institution for three years. Although he has had no previous convictions, the inmate states that on "at least a hundred occasions" he grabbed the breasts of female passers-by on the street and then fled. He gave himself up to the police because he was afraid of his impulse to rape. Another important problem was his impulsiveness and explosive temper resulting in his discharge from many jobs and a Dishonorable Discharge from the service. Despite his I.Q. of 92, he is able to handle abstract concepts adroitly. He is a spontaneous, active member, who added humor to the group, often good naturedly baiting the therapist.

G.T. is a forty-year-old, single patient and has spent eleven years behind bars on fifteen convictions for the same offense—making obscene remarks or gestures and phone calls or passing to women obscene notes or photographs. His present offense consists of saying, "I would sure like to eat you," to a woman who happened to be a policewoman off duty. He received a one year sentence for this and has now been in Patuxent for three years. I.Q. is 105. He is an active group member and takes great pride in recounting his sexual conquests. Preoccupied with his domineering mother, he keeps a scrapbook, which he often brings to meetings, of newspaper clippings about this type of mother.

S.L. is a 20-year-old white, single patient who has spent eight years of his life in penal institutions. His offenses have been arson (age 11), assault and sodomy (age 15), larceny (age 16), and his present offense, assault and sodomy (age 17). He has been in Patuxent for four years, originally obtaining an eight-year sentence. He is the least intelligent member of the group (I.Q. 82), is unable to conceptualize, and was a completely silent member until the last few meetings.

R.T. is twenty-three years old, single, and has spent seven and one-half years of his life locked up for sexual offenses. His most recent offense consisted of forcing at knife point young (8–10 years) boys and girls to submit to sodomy or vaginal intercourse. In addition, he has stabbed a girl and, at the age of ten, set a very costly fire. Originally sentenced for six years, he has been in Patuxent for three years. His I.Q. is 89. He is a pleasant, fairly active member but without curiosity, self-concern, remorse, or motivation.

S.H. is a 36-year-old white, single male who was originally sentenced to three years for coaxing young boys into homosexual practices. He has been in Patuxent for four and one-half years and is the only member who has had previous treatment—twenty months of group treatment at Patuxent and nine months of individual therapy before his imprisonment. He has spent a total of six years in prison for the same type of offense and escaped four other convictions through the influence of his prominent family. He is an intelligent (I.Q. 116), articulate, glib, manipulative patient, often monopolizing the meeting with constant repetitions of historical detail and sterile intellectual unravelings of his problem.

L.I. is a 29-year-old white, married patient who was sentenced to three years for sodomy. He has been in the institution for three years. He has spent twelve years incarcerated in penal institutions for robbery, burglary and prison escapes. His present charge consisted of performing sodomy and fellatio on two young boys, using both bribery and force. This inmate presented the most difficult problem in the group. He is the "classical" Felix Krull (*10*) psychopath in his suaveness, his intelligence (I.Q. 135), his handsome physical appearance, his articulateness and his talent for convincing others of his sincerity and the injustices heaped upon him. The group holds him in awe, and frequently the therapist felt trapped and insecure in dealing with him. When he realized that the therapist was not succumbing to his charm and intelligence, his frustration rapidly increased as he reached a near-panic state.

S.A. is a 27-year-old, white, single patient who received a fifteen-year sentence for assault with intent to rape and has been in the Patuxent Institution for three years. As a result of thirteen previous charges (including two charges of rape) and eight convictions for burglary and drunkeness, he has spent a total of seven years in penal institutions. Convinced that his troubles stem only from a desire to drink and from his inability to handle alcohol, he is an exceedingly resistant member. He denies all the rape charges, claims that he was drunk, had a black-out spell, and remembers nothing of the night of the offense except that he "did not rape anyone." During the meetings he was at first negativistic, silent, and spent much of the time looking out of the window. It was only after months that he appeared to be listening to the discussions. His I.Q. is 99. He is pathetically inarticulate, and on a couple of occasions, has had violent outbursts of rage in the group.

The group has met once a week for an hour and a half, and at the time of this writing has met forty times. Although attendance is not compulsory, the members are aware that in some manner their only chance for freedom involves group therapy and there have been no absences.

The ground rules set in the first meeting included the usual brief statements about the desirability of honesty in speech, and the advantages of verbalizing strong feelings. Because of the deeply personal material to be discussed and the destructive irresponsibility of some of the other inmates, the matter of absolute confidentiality was stressed, with discharge from the group cited as the penalty for indiscretion. It is of interest to note that at no time was there any evidence of violation of confidence. The patients were also told that among the things they had in common was that to date their lives have been ruined by their inability to control certain urges, especially those of a sexual nature. They were blindly driven to do things that either gave them no pleasure or a pleasure immeasurably small when compared with the grief of having been imprisoned a considerable portion of their lives.

PHILOSOPHY OF TREATMENT

The recalcitrance which one encounters when attempting therapy with such a group as this, generates respect and gratitude for an often unappreciated ally in treatment—the voluntariness of the patient. Voluntariness stems from an awareness of personal disequilibrium, from a discomfort arising from within which leads to a willingness to assume responsibility for attitudinal changes. Needless to say, it is a prerequisite for successful therapy, and only after voluntariness has been evoked in the patient does his treatment begin to resemble the course of therapy of the deviants reported upon in the earlier-cited literature. Soon after the group meetings began, voluntariness became the all important issue. Treatment begins when the patient sincerely recognizes that in some way he is responsible for what has happened to him in life. This concept—disarmingly simple at first glance—contains the key to the instigation of treatment of the involuntary patient. The query, "What part do you play in this?" repeated literally dozens of times in the therapy meetings became the entire focus of the first year's work.

The disclaiming of responsibility was mainly accomplished by the transfer of blame for the plight onto something outside of themselves—*i.e.*, other people, the institution, a "bad record," alcohol, bad luck, an unfair judicial system, bad company, delinquent neighborhood and poverty. The lack of a sense of personal responsibility revealed itself in the inmates' upside-down philosophy—their concept of a universe without causality or justice. Many long and always animated discussions were centered around accounts of brutal, evil, immature guards who were invariably the ones promoted. The rare guard who was a "good guy" always got the bad deal. The inmates who were the sickest and most dangerous were the ones who made parole. The ones who went along with the institution were considered "jailwise" and were left to rot in

their cells. "Maybe you have to be bad to get out of here." This attitude colored a large proportion of the subjects discussed and was difficult to deal with. Direct disagreement or presentation of the therapist's value system was, of course, always met with unproductive hostility. However, dealing with detailed individual material directed toward the patient's assumption of responsibility was soon found to be an effective tactic, as is illustrated by the following examples.

D. U., whose offense was grabbing women's breasts, originally blamed the bulk of his problem on his wife. She was depicted as frigid, immature, disloyal, and overly critical of her husband. It was this way right from the beginning of their marriage, he said. He was offered a lucrative job in another state but she refused to move that far away from her parents. Every night when he returned from work, his wife took the car to visit her parents, who lived thirty miles away. When the situation became intolerable, he felt he got back at his wife by grabbing and hurting strange women on the street, and then by calling her attention to the newspaper accounts of these incidents. This story was received unquestioningly and sympathetically by the group. The therapist asked, "What was it that she wasn't getting from her husband that made her run to her father and mother?" This and similar queries had a staggering impact on the patient. It was a point of view he had never once considered and shortly thereafter a wealth of pertinent material was divulged. He had married his wife "for spite" immediately after being rejected by another girl, his wife's friend. On the morning after their marriage he accidentally called his wife by her friend's name. He cheated on his wife in a glaringly careless manner so that he was soon discovered. His accounts of how he insulted her, beat her, and was unable to support her made his wife's behavior more understandable. Unable to obtain or hold a job, the patient again transferred responsibility to factors outside of his control. He described in detail how, when hired for a job as a machinist, he had reported early for work spic and span in clean overalls with only a small patch on one knee, but was nevertheless fired on the spot. The group raised a couple of questioning eyebrows at this account. The therapist exclaimed, "Bullshit! There is something we're not hearing," thereby initiating a constructive group discussion. To save face, the patient maintained his position in this instance but discussed how he had sabotaged other jobs. A prospective employer who turned him down "for no good reason" did know he had stolen a jeep from a former employer and did ask the patient if he would steal from him, to which the patient replied, "I don't know." Example followed example of how he lost jobs for insubordination, fighting, and other evidences of his quick uncontrollable temper, until members of the group remarked, "If I were your boss, I'd be damned if I'd put up with that," and other sobering statements to this effect. In this manner beachheads were established which eventually resulted in the patient's willingness to investigate and even modify his more glaringly self-defeating attitudes.

G. T. is an individual who has spent a considerable portion of his life gesturing or speaking obscenely to females or paying the penalty therefrom. He rationalizes his perversion as a method of seducing women and places the blame for the frantic nature of his sexual quest on his mother, who, he said, had smothered him by restricting all sexual expression. He occasionally brought to the group a scrapbook containing letters which had been published in newspaper advice columns involving domineering mothers. His mother, he said, kept him home until he was 28, prevented him from dating, from talking to girls, and even picked out his clothes and his friends. She even stopped him from masturbating by listening for the squeaking of his bedsprings and then running

to his room to protest. The gambit of the therapist was to inquire, "Why didn't you oil your bedsprings?" After the round of laughter had ceased, the therapist solemnly repeated the question, and eventually the group sensed the patient's complex role in this relationship. An ensuing discussion caused the patient to admit that on several occasions his mother, contrary to the original presentation, had tried to force him to leave home, even resorting to calling the police.

E. D.'s offense was the unusual one of influencing his six-year-old daughter to perform fellatio on him. Although he was the only member too ashamed to discuss specifically his offense in the group, he profited considerably in therapy by investigating his relationship with his wife. He described, at first, this relationship as a perfect one and expressed bewilderment and rage at his wife's turning him in to the police and suing for divorce. He admitted afterwards that things between them had not been going well recently but blamed his interfering in-laws. This explanation seemed adequate for the patient and the group. Many of the other members mentioned the hatefulness of their in-laws. The therapist, however, persisted in asking what he had done to warrant so much hate from his in-laws and wife. The patient's many denials were met with the therapist saying kindly but firmly, "There are many things about this that we're not hearing," until he mentioned how he had attempted to seduce his wife's sister. The patient so enjoyed boasting about his sexual exploits that he gave detailed accounts of innumerable infidelities and his glee at his craftiness in deceiving his wife. He mentioned his deserting her six months after marriage because she was pregnant and was "slowing him down" and how he intentionally placed lipstick smeared shirts where she would see them. This information was so extensive that the group and the patient eventually saw how narcissistic and utterly unfeeling he had been towards his wife. One session ended with the patient soberly remarking, "I guess I can't blame her for wanting a divorce." Slowly attitudes of remorse and curiosity about himself were initiated, replacing the stagnating attitudes of blind rage and self-pity.

S. A., a rapist, divorced himself from his actions by employing the offender's favorite scapegoat—alcohol. His closed system was, "I never got into trouble except when I was drunk. To stay out of trouble all I have to do is to stop drinking. I never stopped before because I didn't want to. This long sentence has shook me up and I'm going to stop now. I don't need treatment." One of the group members remarked, "When you go into a bar, do you pick out your liquor by the label on it: robbery, rape, murder, etc.?" This devastatingly lucid comment temporarily punctured the liquor rationalization.

The above discussion highlights the curious paradox that dynamic psychotherapy, so grounded in determinism, begins when the patient accepts the responsibility for his actions. Psychotherapy aims at delivering the patient to a point where he realizes he has a choice—a choice between persevering in certain self-destructive maladaptive habits or engaging in more active helmtaking of the remainder of his life. The realization that a choice exists is a particularly important and difficult aspect of treatment in the present situation, for one can hardly conceive of a more choiceless group of individuals. Although they are obviously limited in choice by reason of their incarceration, they are even more limited by internal factors.

Hopefully, through recognition of their drivenness and discovery of some of the responsible unconscious factors, they would in a sense rebel and achieve a greater measure of freedom. With temptation removed it was difficult for the therapist to assess freedom from the perverse sexual drive except obliquely, for example, from reports of changes in the fantasy life. However, it was possible to work with the concept of greater freedom of choice in one's responses to inter-

personal situations and to observe improvements in relationships to the custodial officers and fellow inmates. Since almost every member "graduated" to another tier during the course of therapy, there was an especially propitious opportunity to test out new choices of behavior in new social situations.

As therapy progressed, certain important differences became evident between the therapist's role in this setting and his role in the usual outpatient group. He becomes far more important as he is the patient's only (and sometimes their first) close human contact with non-delinquent society. At the same time, however, great patience was required of the therapist to endure the uncertainty of his efforts. The work was slow, difficult, and frustrating. Meetings were often messy and unrewarding. Only rarely did one have the satisfaction of feeling that a therapy session had been skillfully conducted, and not infrequently at the completion of a meeting the therapist felt that he had wasted his time. It is difficult to maintain one's therapeutic vantage point in the face of an onslaught from a group of angry, resentful, uncooperative, manipulating, deceitful, ridiculing, ungrateful, solipsistic individuals. Therapy can occur only when the therapist can empathize sufficiently to appreciate the assumptive world of the patient. This, of course, is a vital step in any successful therapy but perhaps more difficult to accomplish with this type of patient because of the alien and socially unacceptable territories involved.

Their assumptive world is a more understandable one when one recalls that by and large the world has been a brutal and rejecting one for them. For most, their home environment during their formative years was chaotic. Parents were of the lower socioeconomic class, often divorced or separated, usually promiscuous, alcoholic, rejecting and brutal. All seemed sufficiently disturbed as to be incapable of satisfying their children's need for attention and affection. For most, this period was followed by years in the Training School where they learned the facts of life of the social structure. In the Training School people are divided into two groups. You are either a "dope" or a "wise guy." The "dopes" (or "chumps") take the blame and punishment for infractions committed by the "wise guys." They are the "girls" in the forced sexual play and the butt of all the humiliating and often physically punishing horseplay in the "cottage." The "wise guys" are the opposite—the bullies, the sodomists—who from time to time must without provocation beat up a "dope" if they wish to maintain their social status. The therapist is tempted to exclaim, and perhaps with some justification, "But what are you and what do you do to make people treat you so badly?" Historically, though, their universe *has* been an unfair one and one eventually hears from the patients, "But I was a child then. What could a child have been or done?" They *have* been unlucky. Friends *have* committed the same offenses and walk the streets freely. There *are* unfair and brutal guards. There *are* unjust judges who are notoriously unpredictable in the severity of the sentences administered.

Their present life situation is an agonizingly uncertain one. They must stay in prison until a psychiatrist, whom they neither understand, respect or trust, says they are well enough to be released. Even their faith in the penal code has been shaken for, as was seen in the clinical material, most have been incarcerated longer than their original sentences called for. Was the institution a hospital or a prison, they asked. Since the institution was only five years old, most felt that they were guinea pigs—the trial group. Newspapers constantly carried accounts of conflicting opinions as to the constitutionality of the indeterminate sentence.

In the midst of this maelstrom of uncertainty they are ordered to submit to therapy. The therapist is frequently the same individual who was responsible for their commitment to the institution and often, the inmates claim, dishonestly, by quoting them

out of context, distorting their statements, and overemphasizing minor remarks which they felt were made confidentially to a physician. Even these charges may not be completely unfounded since at times it is difficult to communicate to a lay jury impressions gained from intuitive sources which are products of long years of experience. Sometimes one *does* emphasize minor, but more accessible and spectacular, issues to the lay audience.

With this view of the patients' assumptive world in mind, the therapist can function with greater understanding and sincerity. With little inner discomfort, no concept of therapy, the prospect of life imprisonment facing them unless they successfully negotiate this vague business of psychotherapy, and the life attitudes described above, how else could one expect these individuals to react, except by attempting (with their learned social tools) to convince the therapist of their releaseability?

What can be done? If an assumptive world which is the residue of one's life experiences is to be altered, we must supply new, corrective life experiences. These may be supplied in part by their transactions with the therapist, whose task to to present himself to the patients as an individual with a different value system but with whom they may identify. The therapist must be honest, sincere, consistent, and yet close enough to them so that identification may occur. One cannot tell patients this: one must show them over a long period of time. Desiring especially to avoid being viewed as aloof, the therapist allowed greater intimacy with the patients than he customarily does in therapy. Trying to close the cultural gap, the therapist adopted the language of the patients in the liberal use of profanity and prison idioms.

The therapist was often baited by the group and participated good naturedly in this play. For example, a patient began a meeting with, "If you're a psychiatrist, suppose you tell me why I like the color blue while so-and-so likes red." Rather than to interpret this as the patient's trying to test or embarrass the therapist, or, God forbid, ask for associations to blue, the therapist usually replied, "I'm a psychiatrist, not a God-damned fortune teller" or "What the hell's eating you today?" Handled in this manner, the bantering was short-lived as the therapist continued to pick up every lead available and doggedly pursue the serious business of therapy.

When serious questions were posed—for example, about the connection between sex and arson, or whether dreams meant anything, the therapist always answered immediately, completely, and with meaningful illustrations for the patients. This practice seemed to increase the group's respect for the therapist, improved rapport, and bolstered their ego as the therapist showed respect for their intellectual curiosity.

Another extremely important factor in treatment was the therapist's position in relation to the administration (4, 9). At the first meeting the group was told that the therapist would at no time communicate any information about the group or any member of the group to the parole board, to the board of review responsible for their institutional privileges, or to the court, and that in no way would he be involved administratively in their release or detention. This is a difficult idea to accept and to fulfill for both inmates and therapist, but in my mind it is perhaps an indispensable condition for treatment. If the inmates know that they must convince the therapist that they are well before they are released, they will attempt to do just that. They will conceal their psychopathology, seal over and control their stronger affects, withhold personal data, pay lip service to theorizing, and, in short, intensively involve themselves in antitherapy.

This is an especially difficult position to maintain when the institution is so professionally understaffed that the parole board receives a shallow and incomplete picture of each inmate's problem and potentialities

or when the therapist develops strong feelings that a certain inmate is being unjustly or unwisely incarcerated or released.

It is also important to point out that the concept of the therapist's separateness from the administration was an unfamiliar one to the inmates, since all other groups in the institution are conducted by individuals who are at the same time therapists and administrators. The response of the group members to this position varied; the majority approved but doubted my integrity. In the assumptive world they had constructed they had long since grown to distrust and fear authority figures. Even after months of therapy statements like the following occurred. "Recently I said that as long as there are cameras and nude women I guess I'll be taking pictures of them and I've been worrying about whether this was the wrong thing to say." This reveals a persisting conviction that the therapist, like the parole board, must be manipulated. The one member who objected to the policy (the objections becoming increasingly vehement as time went by) was L. I. He wished to know at first what *would* my report be if I had to make one; then he deplored the fact that the therapist, the one person who really knew him, would not testify in court. Later, he accused the therapist of shirking his duty and finally announced that he planned to subpoena him to court. This patient revealed much of himself in these maneuvers—his difficulty in relating to another except in such a way as to use him, his disregard for the group rules, his inner feelings of omnipotence in that, if he could force the therapist to testify, the latter would surely advocate release, since he was certain that no one could withstand the onslaught or his charm and intelligence. All of these interpretations were made and discussed in the group.

GROUP PHENOMENA

Despite their solipsistic world view and unelaborated social machinery, the members gradually developed a sense of groupness. Chauvinistic comments that this was the institution's "best group" were common. Also heard was, "We may not do much therapy, but we do have a good time." The patients had their own coffee meetings for 30–40 minutes after the therapy sessions. The therapist's apprehension that the group might be labeled and criticized by other inmates as a "sex group" was never realized.

Attempts to discuss and utilize aspects of the patients' group behavior were ineffectual for the first few months of therapy, which may have been due to an effort on the part of the patients not to appear critical of each other in order to impress the therapist with their good behavior and the extent of their inner controls. The therapist attempted to point out the obvious bravado of certain patients while discussing sexual exploits but the group did not follow up on this. One member of the group, S. H., tended to monopolize the meetings with intellectualizations and repetitious obsequious attempts to please the therapist. No direct discussion of this by the group could be elicited, though they showed their annoyance in oblique ways, for example, by disagreeing with the patient regardless of his stand on any issue; and on one occasion, another group member, S. A. exploded and threatened to hit him. When questioned about this, however, S. A. could carry it no further than, "If you don't like a guy you don't like him." After several months, the therapist noticed another member making imaginary marks on the wall while S. H. was talking. When pinned down on these gestures, the patient reluctantly admitted that he was "jotting down all the points" S. H. had scored with the therapist that day, calling him a phony and deploring the fact that he spent so much time "sucking in." The therapist attempted to change this into a constructive discussion of S. H.'s monopolistic tendencies with the simple approach, "Well, let's see how we can help S. H. with this problem." This episode stimulated further candid discussions of group be-

havior, which, though often stormy, increased the solidarity of the group.

Unlike the former problem, R. T.'s shyness and reticence to talk became a topic of discussion, opening the important area of his lifelong isolation, his lack of friends, and especially his total inability to approach a female, which may have been one of the factors driving him to satisfy himself sexually in illegal ways.

The most difficult problem which was not resolved was the behavior of L. I., who most closely resembles the popular notion of the psychopath. He is so bright and articulate (his institutional job was that of teaching school) that the rest of the group held him in awe. He spent the first few months helpfully suggesting to the group topics for discussion, making useful interpretations, and occasionally reciting his well-rehearsed formulation of his personal psychodynamics. As time went by he realized that the therapist was serious about his stand on nonintervention in parole proceedings, he grew more concerned, became angry, and demanded continuously that the therapist reveal his impression of the inmate. Upon refusal of these requests, he grew panicky, cried and screamed on several occasions, and became insulting and sarcastic to the therapist. On one occasion he said, "When I get out of here, I'm going to meet you on the street, get you against a wall and make you tell me what you think of me." The therapist's attempts to clarify and interpret his behavior—his use of people, his inability to relate except narcissistically, his anger because the therapist had not been seduced by his charms, and his over-dependence on external props for his self-evaluation were initially of little value. Months later, however, he remembered these interpretations almost verbatim and cited them as the most important thing for him in the year's work.

An especially difficult problem to handle was the patients' tendency to spend long periods of time discussing institutional affairs, injustices or gripes. This was particularly marked during meetings which followed board of review sessions in which one or more members were refused parole or a requested privilege. At these times, tedious, disgruntled, unproductive harangues continued for thirty to forty minutes. No successful method of making better use of this time was discovered. When the therapist directly commented on the time being wasted, there always ensued a sullen, unproductive period. Although it was occasionally possible to pick up leads and direct the discussion to more useful channels, it seems as though one generally has to live through these discussions, implying disapproval by nonparticipation, and allow the group to learn that nothing useful comes from them. Eventually, after several months, these discussions became less frequent and were cut off promptly by the group members themselves. One measure of the success of the techniques described above was the complete absence of utterly unrelated material, *i.e.*, baseball, television programs, which so often appears in nonvoluntary therapeutic groups.

COMMON PSYCHODYNAMIC THEMES

In the beginning the group seemed to be a band of homogeneous individuals, homogeneous in the general nature of their offenses, in their lower socioeconomic class, in the frequency of a broken or chaotic home during their formative years, and in an antisocial sense of values assimilated during their many years in jail. As the work progressed, though, one became impressed with the enormous diversity in the individual dynamics and with the inability of the psychiatric terminology to communicate this diversity.

An obvious theme and one with which the group worked well was that the sexual drive and offense was actually a substitute for other affects. The expression of rage through sex was an important phenomenon and one which was found operating in every group member. The group responded with great interest when the therapist on several occasions phrased his comments in such a way as

to suggest that he and the group together were engaged in an investigative pursuit of the relationship between anger and sex. Abundant data was available for this pursuit. A particularly effective verbal example cited was the most common expression of anger in the institution, the words "fuck you," an expression used several times in the group during some explosive temper outbursts. Many inmates alternate sexual offenses and aggressive, destructive crimes or find one replaced by the other (16). Three of the group members had set extensive fires and two had been vandalists. Most of the group were unaware of the aggressive components of their sexual compulsion and the uncovering of this in the therapy work was a useful revelation.

G. T. (the obscene gesturist and note-passer) has always looked upon his perversion as "a bit of devilment" and his way of seducing girls. "At least it was direct. You told them what you wanted right off and some women appreciate that." This is a face-saving rationalization in two ways. First it allowed him to preserve his illusion of being the hyperpotent male whose only flaw was having too much of a good thing—"sex juice." Secondly, this rationalization allowed him to continue his illusion of self-determination, concealing from himself the fact that he, in reality, was being driven by factors outside of his awareness. This illusion was difficult to deal with, for it served the vital function of warding off the unpleasant, even intolerable, affect accompanying the recognition of the aimlessness and uncertainty of his existence. As is often the case in psychiatrically unsophisticated patients, it was with much bravado and extensive detail that he recounted his erotic adventures. It soon became clear that his offenses were in no way preludes to a sexual relationship. His obscene phone calls and many of his notes were anonymous. He usually set up a situation where the female could not possibly respond to his message (*i.e.*, leaving a note on a restaurant table after finishing a meal), and later came the admission by the patient that on the rare occasions when the recipient of his message did respond favorably, he fled the scene. Eventually the entire group understood that the notes and gestures were angry ones thoroughly insulting and contemptuous of women. The patient knew that his actions were inextricably tied up with his mother and that somehow he was "striking out at her." Though the verbalized grievance, as mentioned earlier, centered about his mother's destructive possessiveness, there was also evidence to suggest that he was reacting to mutual incestual feelings and to the warmth and mothering he did not get. However, the patient was not able to deal with this material in the first year of treatment.

D. U. went out to seize women's breasts after arguments with his wife. He was aware that the act provided little sexual satisfaction; no orgasm was involved, only occasionally was the deed accompanied by an erection, and the compulsion was not influenced by prior intercourse or masturbation. Wanting to hurt his victims, he never caressed but grabbed, while studying their faces for pained expressions. Much of this rage was traced back to a severely rejecting mother and a brutally punishing father, from whom he tried unsuccessfully to escape through an unwise marriage.

Despite his initial description of a perfect marriage, E. D.'s relationship to his wife was obviously a sado-masochistic one, each dedicating himself to the destruction of the other. The patient, as mentioned above, was flagrantly unfaithful taking great pleasure in deceiving his wife. He attempted to seduce her sister and then "desecrated the thing closest to her heart"—their daughter. His wife retaliated by turning him over to the police in an angry moment some weeks after he confessed to her. Though there seemed to be abundant evidence that under his insatiable search for women lay much doubting of his masculine potential, the patient either rejected or paid mere lip service to this

interpretation. Curiously enough, all other members denied feelings of masculine inadequacy, while at the same time all openly admitted homosexual interests, which were almost universal in the institution and therefore socially accepted.

The sexual offense committed as an angry response to a rejection was not uncommon. R. T. was told by his mother that his bags would be packed and outside the front door if he came home without a job. Instead of job hunting he attempted to rape an eight-year-old girl. S. H. was informed by his "steady" of several years that she was engaged to another and he responded by going out for the first time to cruise for young boys. L. I. discovered what he thought was his wife's unfaithfulness and that evening forced a young boy to submit to a sodomy.

RESULTS

Accurate assessment of any form of psychotherapy is notoriously unreliable and at present is a major and active area of research. Assessing the results of therapy with the group of patients discussed in this article is manyfold more hazardous. These patients are physically separated from the objects of their sexual compulsions and because of their fear of prolonged incarceration are unable to reveal honestly their present mental state. These deficits deprive us of even the usual points of departure for our educated guesses. Though many have been proposed, there are no psychological tests which allow us to predict accurately the offender's behavior when he is again "on the streets." However, there is much to be learned by noting clinical changes occurring in these patients during the course of a year's therapy.

The vignettes at the beginning of this article are printed in the order of the individual patient's response to treatment. The first two patients, E. D. (who had coerced his daughter to perform fellatio upon him) and D. U. (who impulsively grabbed strange women's breasts) were the ones who profited most from treatment. Both had gained considerable insight into the factors responsible for the perverse impulse, had taken steps to remedy these factors (for example, reconciliation and open discussion with their wives) and had worked with understanding on other self-defeating attitudes. In my opinion, both had improved to the point where they were good parole risks provided they continued treatment on an outpatient basis.

G. T. (the obscene gesturist and note passer) was the oldest and, it was thought initially, the patient whose psychopathology was most firmly fixed. During the course of therapy there were many evidences of changing attitudes. After months of bedrock resistance he arrived at the genuine realization that his gestures and notes were not sexual foreplay, as it were, but blind expressions of anger towards women. Hopefully, the driving forces behind his chief symptom have been sufficiently undermined to allow him to stay out of prison. Deeper changes in his way of life were not effected and he will continue to be a lonely, sexually preoccupied transient.

Because of his low intelligence and his reluctance to articulate, S. L. seemed a doubtful candidate for therapy (11, 17). During an individual interview at the end of the year he gave evidence, however, that he had, despite his silence, been an attentive and interested member. This corroborates the experience of others that a silent group member may still benefit from treatment (8). He remarked then that he had been reluctant to speak because of his shame of his offense (forced sodomy with young boys) and because of shame of his ignorance (during the meetings he frequently heard words he did not know and concepts he could not grasp). Unrealistic but nonetheless encouraging was the extent of his identification with the therapist. He had carefully charted the next fifteen years of his life planning to become first a hospital orderly, then a practical nurse, a registered nurse, a college graduate, and finally, when enough funds had been

saved, a medical student and eventually a physician.

R. T. was little influenced by the year's work except that a sense of curiosity and self-concern were generated, thus motivating him for future treatment. He rarely discussed his offense (forcibly sodomizing children) but was able to discuss the important areas of his aloneness, his shyness, his need for external props to maintain his self esteem, and his inability to sexually approach females who are his contemporaries.

S. H. (also a pedophile) was at times a monopolizer, verbalizing copious but unproductive accounts of his childhood, his oedipus conflicts, his sense of rejection. His unctuous behavior generated much hostility against himself both in and out of the group. His defenses receded and more honest introspection occurred after these aspects of his interpersonal behavior were discussed. Perhaps through this route he may, in the future, establish a close enough relationship with a therapist to function as an outpatient. Previous outpatient psychotherapy had failed primarily because of his inability to trust and confide in his therapist.

L. I. (who had sexually assaulted two children) is so adroitly manipulative that he is extremly difficult to evaluate. Interpretations of his behavior during the meetings were important to him and if pursued over a long course of therapy might be efficacious in modifying some of his most flagrantly antisocial attitudes. Undoubtedly, though, he will be successful in obtaining his release long before he is ready.

S. A., a rapist and, incidently, the only severe alcoholic in the group, was a complete therapeutic failure. Unlike the other group members he maintains that he is innocent of the charge against him and persistently looked upon the group proceedings as nonsense. He was so inarticulate (stammering and possessing an infantile vocabulary) that his silence and resistance may have been a face-saving device. Occasional encouraging signs, such as attentive listening or the sudden recall that his first criminal offense (vandalism and burglary) occurred immediately after discovering his mother in bed with a neighbor, were all short-lived.

It is significant, though of course not statistically so, that in a four-month period immediately preceding treatment the group members received a total of five disciplinary tickets, whereas during the same four-month period following eight months' treatment there was only one infraction, and that a minor one (possession of a photograph of a nude woman). Six of the eight members received a tier promotion during the year. (There are four tier levels at the institution.) This represents a greater number than one would ordinarily expect without treatment. The two members not promoted were S. A. (at the bottom of the list) and S. L. whose silence and degree of withdrawal (as pointed out above) erroneously cause him to appear recalcitrant. Of the two patients at the top of the list one, D. S. is now being considered for parole, and the other E. D. has been given the privilege of an outside job. All of these promotions have occurred without the therapist's intervention.

SUMMARY

Experiences with group therapy of incarcerated sexual offenders at the Patuxent Institute in Jessup, Maryland, have been presented. The patients, whose offenses included rape, sexual assault of minors, obscene note passing and incest, were all chronically ill—manifesting their symptomatology for years and usually having served previous prison sentences for the same type of offense.

The results of therapy with a group of patients so often considered untreatable were encouraging. A philosophy of treatment and therapeutic tactics were described. The initial and most crucial step in therapy was to generate in the patients a sense of voluntariness—a sense that they, rather than a host of extraneous influences, were in some

way personally responsible for the misery they were encountering in their lives.

For the therapist to maintain his professional equilibrium he must empathize with and constantly be cognizant of the assumptive world of his patient—a world contructed in a logical manner from deprived and often brutal life experiences. To alter the assumptive world one must supply corrective life experiences with one's own person. A sense of unusual intimacy, down-to-earthness, and mutual respect tend to generate a therapeutic identification and trust.

A detailed investigation and analysis of the specific offense was usually a blind alley in therapy. Progress was made instead through discussion of relevant aspects of their physical and psychological worlds. Emphasis was placed upon their social withdrawal, their inability to approach their peers for normal sexual relationships, and their relationships to their wives and parents.

It is important for the therapist to be only a therapist and separate himself completely from administrative bodies which have the responsibility for privileges and parole.

Discussion of the group behavior of the individual patients rarely occurred for the first several months. However, when the tension had lowered to the point where this material was utilized was of great importance in demonstrating to the patients their impact on other people. In this way they grew aware of the role of their behavior in the formation of their life environment, which hitherto had been deemed so malevolently unalterable.

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A SEARCH FOR LUNACY[1]

LOREN J. CHAPMAN, PH.D.[2]

Since early recorded history there has been in many cultures and in many ages a recurrent observational report that the timing of outbursts of psychotic behavior is related to the phase of the moon. The literature on this belief is very extensive, but has relied primarily on anecdotal observations. Both Kelley (1) and Oliven (2) have reviewed the literature. Statements about such a relationship are attributed to such diverse sources as the Bible, Shakespeare, the Malleus Maleficarum, Blackstone's commentaries on English law, and various clinical observers as well as to folklore. The full moon has most often been implicated, but the new moon has also been mentioned by some writers.

In recent years there has been very little in the way of investigation of the lunar hypothesis. One of the few professional workers concerned with it has been Ravitz (3–5) who has primarily been interested in relating changes in electrical potential of the human body to both emotional changes and to lunar phases. In support of the lunar hypothesis he has reported several occasions on which psychotic symptoms increased during either the full or new moon.

There has apparently not been previously any attempt to investigate the lunar hypothesis by means of group data and statistical tests. The present report describes two attempts to determine if such a relationship exists.

PROCEDURE

The hypothesis was investigated for four different groups of patients. Group 1 consisted of functional psychotics for whom dates of admission to a psychiatric hospital were tabulated. Groups 2 and 3 were schizophrenic patients for whom episodes of violence were tabulated, and Group 4 were paretics for whom episodes of violence were tabulated.

Group 1 consisted of patients admitted to Cook County Hospital Mental Health Clinic, an inpatient diagnostic center. Patients are hospitalized there for short periods before being transferred to other institutions. The hospital is required by law to admit without delay any person needing hospitalization for psychiatric reasons, and overflow is handled by transfer of previously admitted patients to other hospitals. Clearly this hospital is better suited for an investigation dealing with dates of admission than is a hospital which keeps a waiting list.

All admissions were tabulated by date for the period December 31, 1956 to May 28, 1957, a period which included five complete lunar months. The five dates of occurrence for each of the four phases of the moon were obtained from the World Almanac.

Strictly speaking, the four phases each occur only for an instant each lunar month. Therefore, when an observer reports that an event occurred at a certain phase of the moon, it is unclear whether he means that it occurred during the period of time between the phase named and the occurrence of the next phase, or if he instead is referring to a brief period of time on either side of the specified phase. Therefore, the present data were analyzed with respect to both interpretations.

Altogether there were 3,231 patients admitted during this 149-day period, *i.e.* an average of 21.7 patients per day. Admissions on Sundays and holidays tended to be lower, the average number of admissions on the 21

[1] This study was supported by a research grant (M-3481) from the National Institute of Mental Health, Public Health Service.

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Sundays during this period being only 7.6. The mean number of admissions per day for the periods between phases (*i.e.*, for all the days before the next phase) were: new moon to first quarter, 20.4; first quarter to full moon, 23.1; full moon to last quarter, 20.5; last quarter to new moon, 22.3. The chi-square statistical technique was used to compare the number of admissions in each of the four periods with the portion of the total admissions that would be expected by chance in the number of days involved. The results indicated so significant departure from chance expectation (chi-square = 6.84; d.f. = 3; $p = .08$).

The data were also analyzed in terms of the number of admissions occurring in the three-day period which included the day on which a phase occurred, as well as the day preceding and the day following. In the five lunar months studied there were, of course, five such three-day periods for each of the four phases. For the first quarter, three Sundays fell in these three-day periods, and for the other three phases, there were two such Sundays. The mean number of admissions per day over the entire fifteen days were: new moon, 18.8; first quarter, 21.1; full moon, 21.2; and last quarter, 21.8. These frequencies are seen to be close to the mean of 21.7 patients per day, for the entire 149 days. A chi-square analysis verified the fact that the obtained values for the four phases did not differ significantly from one another (chi-square = 3.77; d.f. = 3; $p = .30$).

These analyses were repeated for subgroups within the total group of 3,231 patients. These subgroups were male schizophrenic patients, female schizophrenics, male functional psychotics, and female functional psychotics. For each of them the results were quite similar to the results for total admissions.

Admission data, however, are far from ideal for testing any hypothesis concerning dates of psychotic behavior. Inspection of the clinical records used in our first study indicated that for many of these patients a span of time had elapsed between the day that they first clearly required hospitalization, and the day that they received it. In many cases, there was no specific unusual incident which precipitated hospitalization, but instead the decision to hospitalize was reached by the family after months of gradually increasing psychotic symptoms. Even in cases for which hospitalization was precipitated by recent changes in behavior, it was often difficult to identify a day on which this first occurred. It appeared, therefore, desirable to test the lunar hypothesis by more direct measures of psychotic upheaval.

The measure chosen was incidents of violent behavior on the ward recorded in the clinical folder of hospitalized patients. This measure seems especially appropriate since violence and agitated behavior have been specifically singled out in the anecdotal literature as phenomena which are related to the phase of the moon (1). Data, moreover, are readily obtained for this measure because records of assaults are as a rule more faithfully kept in hospitals than are records of other varieties of psychotic behavior.

Three groups of patients were used for this part of the investigation which will be called Groups 2, 3, and 4.

Group 2. The clinical records of 57 male schizophrenic patients at Chicago State Hospital were obtained. Only those patients were included who had a record of being involved in at least four incidents of violent behavior. It was usually not possible to determine here whether the patient whose folder was at hand had initiated the altercation. However, since only about a fifth of the patients had had as many as four such episodes, it was assumed that in the majority of cases the incidents could be attributed to the patient whose folder was at hand. The mean number of altercations per patient folder, for the patients who were included, was 8.8. Care was taken to insure that each incident was recorded for only one patient.

Group 3. These patients were 41 schizophrenics hospitalized at the Veterans Administration Hospital, Lexington, Kentucky. The mean number of incidents per folder was somewhat higher for this sample, 3.9, probably due to more exhaustive record-keeping. Again only patients with at least as many as four incidents were included, but about one-fourth of the patients met the criterion.

Group 4 consisted of 39 male paretics from the Lexington Veterans Administration Hospital who met the criterion of four incidents. About one-third of the paretic patients met the criterion. The mean number of incidents per patient for the 39 paretics was 12.5.

For the patients in Groups 2, 3, and 4, the date of each incident was recorded and the number of days from the occurrence of a phase of the moon was obtained. The results are shown in Table 1. Since the dates were scattered over the years between 1932 and 1959, so many lunar cycles were sampled that it may be assumed that the mean periods between the four phases average the same number of days.

The data in Table 1 do not appear to indicate any relationship between lunar period and number of assaults. To verify this statistically, the number of incidents for each of the four periods was counted for each patient. An analysis of variance by ranks (6) for the three groups combined showed no statistically significant tendency for the patients to be involved in assaults in one period rather than another. ($F = .70$; d.f. $\cong 4$ and 409; $p > .05$).

The incidents recorded were also tabulated for the three-day period around each of the four phases in each of the five lunar months. The number of incidents that would be expected by chance to fall in any such three-day period was computed for each group by multiplying its total number of incidents by the fraction 3/29.531, the denominator being the number of days in a lunar month. Both the obtained and expected frequencies of incidents are shown in Table 2. Inspection of

TABLE 1

Incidents of Violence and Lunar Period

	New Moon to First Quarter	First Quarter to Full Moon	Full Moon to Last Quarter	Last Quarter to New Moon	Total
57 schizophrenics (Chicago)	130	126	125	119	500
41 schizophrenics (Lexington)	127	160	151	131	569
39 paretics (Lexington)	130	131	115	113	489
Total	387	417	391	363	1,558

TABLE 2

Incidents of Violence in the Three-day Periods Around Each Lunar Phase

	Chance Expectation	New Moon	First Quarter	Full Moon	Last Quarter	Total
57 schizophrenics (Chicago)	51	61	51	67	58	237
41 schizophrenics (Lexington)	58	40	56	75	48	219
39 paretics (Lexington)	50	41	38	49	57	185
Total		142	145	191	163	641

Table 2 does not indicate any marked departures from chance expectation. An analysis of variance by ranks for the three groups combined yielded no overall significant difference between the four phases as to frequency of incidents. ($F = 1.87$; d.f. $\cong 3$ and 381; $p > .05$).

In addition, the distribution of incidents across the lunar month was tabulated for individual patients, in order to determine if individual patients might show a tendency toward self-consistency as to the phase of the moon in which their incidents occurred, despite the lack of consistency between patients. An inspection of this tabulation revealed no such tendencies.

It is concluded that the data failed to support any relationship between assaultive behavior of psychotics and phase of the moon.

SUMMARY

Much folklore and anecdotal observation has reported a relationship between outbursts of psychotic behavior and the phase of the moon. To investigate this hypothesis, the phases of the moon were tabulated for the dates of admission for 3,231 patients. No relationship was found between lunar phase and number of admissions.

In addition, phase of the moon was tabulated for 1,069 incidents of assaultive behavior as recorded in the clinical folders of 98 schizophrenics, and for 489 incidents recorded in the folders of 39 paretics. There was no relationship between phase of the moon and the incidents of assaultive behavior. In addition, there was no tendency for individual patients to be consistent as to the phase in which their incidents occurred.

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ROBBINS, R. H. *The Encyclopedia of Witchcraft and Demonology*. Crown Publishers, New York, 1959. 571 pp., illus. $7.50

How does one justify the publication of a reference work on witches and demons in this enlightened era of automation and ataractic drugs? One answer to this question follows from a statement made by the author in his introduction. "Nothing about witchcraft is more ominous than the suppression and destruction of man's power to think and his right to ask questions." But advocates of thought control—witch hunters—are still among us, and their activities are no less ominous today than they were 350 years ago. From this viewpoint, the justification for Robbins' *Encyclopedia* and that for Arthur Miller's *The Crucible* are the same; both are works of considerable political significance.

Needless to say, the publication of the *Encyclopedia* can also be justified on other grounds. Ernest Jones makes this pertinent observation in *On the Nightmare*: "What... are now called neurotic or psychotic patients are in a large measure the descendants of the old Witches, Lycanthropes, and so on, together with the people who believed in them." Dr. Robbins' work may thus be seen as a contribution to transcultural psychiatry, a source book in the psychopathology of another age. Incidentally, the author himself would scarcely accept this view, believing that as a Christian heresy, witchcraft lies in the province of theology rather than anthropology, folklore, mythology, legend ... or psychiatry.

However one chooses to view the *Encyclopedia*, it is a work of impressive scholarship, with over 1,000 primary works on witchcraft listed in the bibliography. There is little if any relevant material that cannot be found in its pages, from the fifteenth to the eighteenth century, and from border to border of Western Europe (as well as the episode of the Devil in Massachusetts). The inclusion of lengthy excerpts from original sources, *e.g.*, court records of the witch trials, and hundreds of illustrations from contemporary accounts make Robbins' *Encyclopedia* a wonderful volume for browsing, as well as an invaluable reference work.

A. B. Silverstein

BEECHER, HENRY K. *Measurement of Subjective Responses: Quantitative Effects of Drugs*. Oxford University Press, New York, 1959. xvi + 494 pp. $12.75

The book is an encyclopedic distillate incorporating 1,063 references dealing with various aspects of investigations which the author as a research anesthesiologist has compiled on the quantitative effects of drugs, particularly in man. The author has organized his experiences into a two-part presentation. In Part I he has made an effort to include all the pertinent literature which has appeared in the past hundred hears in the "measurement of pain." This is subdivided into an Introduction; Methods of measuring pain; Placebos and placebo reactors; Statistical problems and their solution (this section was prepared by Frederick Mosteller, Professor of Mathematical Statistics at Harvard University); The pain threshold; The pain threshold and analgesic agents; Drug interactions, synergism, potentiation; Factors said to produce variation in the pain threshold other than analgesics, and Reaction factors of pain experience. Woven throughout these chapters are experimental presentations which the author and his coworkers have carried out in their efforts to shed further light on these issues.

In a summary to Part I some conclusions are presented which may stand for some time as challenging points of departure for future investigators. These are that pain cannot be satisfactorily defined except as every man

defines it introspectively for himself (Chapter I). Pain sensations and pain perceptions are identical. Neither represents the "original sensation" alone, but represents also an indefinite amount of psychic processing or reaction component (Chapter 9). No convincing demonstration has yet been given that the pain threshold is a constant from man to man, or from one time to another in a given man (Chapter 5). More than a score of factors are said to produce variations in the pain threshold. Not a single experimental study has controlled even the majority of these factors. Conclusions concerning pain threshold must therefore be tentative (Chapter 8). Analgesic agents appear to exert their principle, if not entire, effect on the "reaction component" rather than on the "original sensation" (Chapter 9). The author felt this was perhaps at once the most striking and most surprising concept to come out of this long study.

In Part II, entitled "Quantitative Study of the Effects of Drugs on Various Subjective States," the following chapters are presented: Measurement of "mental clouding" and other subjective effects of morphine; Sedation and hypnotic states; Quantitative effects of anesthetic agents on subjective states; Psychotomimetic drugs; Euphoria, dysphoria; Quantifiable expressions of anxiety; Quantitative study of the effect of a narcotic on hunger; Nausea; Pruritis; and Experimental and pathological cough in man—subjective and objective components. Some of these chapters have summaries which are quite helpful.

One of the considerations which made the book of particular interest to this reviewer was the approach of the author; an anesthesiologist, into areas usually associated with the behavioral sciences. It is quite stimulating to observe the effectiveness with which this was accomplished. The capacity of the highly specialized scientist to link his experiences as a psychopharmacologist and anesthesiologist with those of the students of the personality structure, resulting in this type of a communication, augurs well for such multidisciplinary presentations. The book also tended to emphasize the fact that the approaches to the problems indicated in these studies would ultimately reach a stalemate unless new techniques of study could be developed.

Obviously, a compendium of this type will have many limitations. Its greatest limitation probably results from the fact that the author attempts to convey so much information. This results in a prolonged series of reference numbers in the text which creates some interference with the reading process. There are many summaries of experimental contributions whose effectiveness are diminished by a lack of critical evaluation. The detailed reporting of the experimentation of Beecher and his coworkers does not make for easy reading. The wide range of the material covered tends to at times bring about some redundancy. Despite these criticisms which we consider of a minor nature, it is our overall impression that the author has done a remarkably good job in presenting a great deal of information in a highly complex area with the dispelling of certain unfounded therapeutic heritages. The book is recommended as a worthwhile addition to the library of the behavioral scientist.

Albert A. Kurland

FINN, MICHAEL H. P. AND BROWN, FRED, EDS. *Training for Clinical Psychology*. International Universities Press, New York, 1960. vii + 186 pp. $4.00

This book is a collection of thirteen papers given at the Springfield-Mount Sinai Conferences on Intern Training in Clinical Psychology in 1955 and 1956. While it may be over-shadowed by the report of the Miami Conference on Graduate Education in Psychology, it is nonetheless valuable for its forthright presentation and discussion of the problems met in clinical psychology training. The contributors are obviously well-qualified

and, for the most part, were conscientious and industrious in executing their assignments.

The emergence of a theme, or focus of organization, throughout the book is interesting to observe. Problems arising from the clinical psychologist's dual dedication to scholarly research and professional service appear with a consistency which apparently was not particularly planned or anticipated. About half of the book deals with the following: the division of responsibility for teaching clinical skills between the university and the practicum center; the problem of the image that is provided for the intern's identification; and the search for "proper" emphases for the various functions of the clinical psychologist. In these areas, in which the academic-professional schism is most prominent, positions are at variance, heat is generated, but resolutions are of necessity ambiguous or non-existent. The editors state that the vagaries of the recording apparatus prevented inclusion of discussion and comments, and this is most unfortunate since the interchange among the participants should have been exemplary of the healthy interaction that will eventually solve the problem.

The remainder of the book concerns itself with the more practical day-to-day problems of training. There are analyses of the problems in selecting interns, of the delicate intern-supervisor relationship (how "therapeutic" should it be?), and of the composition and scheduling of intern groups. The inclusion of a physician and a social worker who make contributions in the areas of their own special competence demonstrates that the goal orientation and wisdom of the editors transcended professional provincialism. There are "how to" chapters: how to establish effective communications; how to actually find that evanescent time for research. Here, with goal-conflicts set aside and immediate problems to solve, appear many useful ideas for any staff that is not an all-inclusive program. However, the reader should note that this is not an all-inclusive "how to do it" training manual; it is a companion, but not a substitute, for more comprehensive guides such as Luchins' recent book on training in clinical psychology.

The principal flaws in the book are inherent in its developmental history. It is a collection of articles by authors who apparently had little opportunity to talk, or talk back, to each other. As a result, one is left to construct for himself the meeting of ideas, the exchanges, the insights, with a vague feeling of having been cheated. One also finds annoying redundancies, such as repeated historical introductions. To provide a synthesis or over-view of the diverse ideas presented would have been a task of heroic proportions. The editors settled for a recapitulation that does little more than supplement the index.

James E. Lindemann

FEIFEL, HERMAN, ED. *The Meaning of Death*. McGraw-Hill, New York, 1959. xviii + 351 pp., illus. $6.50

This book is an outgrowth of a symposium on the psychology of death and dying, held at the 1956 annual meeting of the American Psychological Association in San Francisco. The editor, Herman Feifel, Ph.D., was also the organizer of this symposium. Twenty-one contributors of multidisciplinary representation focus on the problem of death in a highly individualistic approach.

Part I, "Theoretical Outlooks on Death," discusses the meaning of death from the standpoint of psychiatry, religion and philosophy. Carl Jung, patriarchal figure of analytical psychology, opens the discussion by comparing the curve of life with that of a parabola of a projectile which rises and then descends to a state of repose. Since the growing man is prepared for life over 20 years, he asks, "Why should not the older man prepare himself 20 years or more for his death?" He asserts that it is just as neurotic in old age not to focus upon death, as it is in

youth to repress fantasies having to do with the future. He concedes that the problem of death "exceeds the competence of empirical science" and embarks upon a discussion of parapsychology, including telepathic phenomena and their space-timelessness, which he ascribes to a symbolically "eternal" psyche. To this reviewer, this is a rather mystical, parapsychological, unscientific chapter.

Psychiatrist Wahl decries the almost universal recourse to magic and irrationality in an age of belief in Science, employed in handling the anxiety of the phenomenon of death. Methods to preserve and beautify the corpse to create the illusion of sleep, religions "guaranteeing an immortal state" in return for credence (faith), all seem escapes from reality and the inescapable fact of finitude. He deplores that thanatophobia (fear of death) has had so little attention and study, and wonders if this is not in part a defensiveness of psychiatrists and analysts. He believes this has been psychologically costly for both the individual and society. He calls attention to fear of death occurring in children and proposes to use this avenue as a method of intensive study. Wahl contends that many obsessional and anxiety reactions in children and adults are related to the fear of death and that this fear, like the fear of sexuality, when deeply repressed, is extensively symbolized and results in much symptom formation and suffering. This is an excellent chapter, dynamic, clear and penetrating.

Theologist Tillich asserts that "there is no way of judging time than to see it in the light of the eternal." He asks, "If one is not able to die, is he really able to live?" He distinguishes between eternity and an endless future and asserts the eternal is neither timelessness nor endless time, but above time. "We are what we are by what we come from"(!). He discusses the changing of traumatic infantile experiences into blessings by altering the meaning of the facts through forgiveness and repentance. This chapter can be likened to an act of prayer, but helps little to understand the meaning of death and its phenomena.

Philosopher Kaufman examines existentialists' exercises in philosophy concerning death and compares views of Heidegger, Sartre and Camus with those of Freud, Tolstoi and Hölderlin. The gobbledegook terminology of Heidegger culminates in the following statement. "Understanding is the existential Being of the own Being-able-to-be of Being-there itself, but such that this Being in itself opens up the Where-at of Being with itself" (page 43). Kaufman concludes that a person who has made something of his life can face death without fear. This chapter could well have been omitted without impairing the value of the book.

According to philosopher Marcuse, man is free only if he conquers his death, and brings it under his control. As long as life constitutes earning a living rather than living, it tends to become a means rather than an end. The ambiguous concepts of eternal life and cessation of life at death reflect the confusion of philosophers who gladly take refuge in Freud's hypothesis of a death instinct.

Part II, "Developmental Orientation Toward Death," returns to less abstract and speculative subject matter and deals with the concepts of death of various age groups and population segments. Child Psychologist Nagy distinguishes three stages in children's ideas about death. At three to five, death is a temporary departure; between five and nine, death is personified as a skeleton or death-man, who carries the dead away; after nine or 10 death becomes the dissolution of bodily life, inevitable to all and reflects the child's general picture of the world. This is an excellent chapter, vivid and realistic in observations, sound in interpretations.

Psychologist Kastenbaum has investigated the meaning of time and death in high school students and concludes that adolescents live in an intense present, whereas past and future (including death) are relatively unreal. A minority of 15 per cent of students studied were death-oriented and these were

outspokenly religious. He agrees that our culture frightens people from conscious contemplation of death and concludes that the adolescent's concept of death may have profound influences on the person's handling of problems in later life. He also calls for more intensive research into the psychological aging process. This chapter is of value for problems raised rather than solved.

The Editor himself (Feifel), in a continuing series of research investigations, examines attitudes toward death of the older person, the mentally ill and the dying patient. Two views exist: 1) The natural end of life, and 2) the beginning of a new life. He reports that attitudes are strongly influenced by experiences of early life (castration fear?); that uselessness in old age is feared more than death; that most people want to die quickly without suffering. The religious person was found to be more afraid of death than the non-religious individual and the belief of going to heaven did not temper this fear. Meaningful general observations add to the flavor of his presentation, *e.g.* "we reject the aged because they remind us of death"; "physicians often reject the dying patient because of wounded narcissism." Feifel's findings indicate that it is wrong to treat terminally ill patients by creating barriers, as dying patients want very much to talk about their feelings and thoughts regarding death. This applies especially to physicians, since terminally ill patients prefer honest talk about the seriousness of their illness. It is not what the patient is told, but rather how it is done. Death can mean different things to different people and a person's reaction to a death-threat depends largely on his character structure. Feifel proposes systematic research into adaptive and maladaptive reactions to death-threat and other types of stress situations.

Part III, "Death Concept in Cultural and Religious Fields," deals with death themes in modern literature and art, funeral rite symbolisms and grief in religion. English Professor Hoffman discusses death and modern literature. His eloquent speculations regarding grace, violence and self in the light of images and metaphors are highly readable, but hardly add to an understanding of the meaning of death.

Art Professor Gottlieb illustrates how the modern artist pictures the idea of death. Although relying heavily on symbols (watches, clocks, birds, cemeteries, decay, etc.), modern art tends to keep away from portraying death, even minimizing it in favor of the importance of life.

Anthropologist Mandelbaum describes how funeral rites bolster the solidarity of the social group and thereby help the bereaved toward reorientation. He gives excellent differential examples of ritual ceremonies varying from great tribal events to hurried formalities. He points out that American culture has become deritualized and that the bereaved have to work out a solution for themselves with relatively little help toward personal reorganization.

Pastoral Counselor Jackson, while emphasizing reality maintenance in grief reactions, invokes analytic mechanisms like incorporation, substitution and feelings of guilt, to describe the working through of grief, especially as it is made possible by ritualized religious expression. He then makes references to the occult, mysticism and parapsychological phenomena, which have a pseudo-scientific flavor and do not enlighten the reader concerning the meaning of either life or death.

Part IV, "Clinical Experimental Studies," reports on clinical observations and opinions of physicians, psychiatrists, as well as experimental results of studies in religion and suicide. Psychosomaticist Hutschnecker believes the dying patient remains true to his basic personality, without showing convincing evidence in describing general emotional characteristics of cancer and heart disease patients. His speculative testimonial culminates in the far-fetched suggestions that malignant disease may be of psycho-

genic origin and that chronic stress results in liver and gallbladder disease, conclusions hardly acceptable from scientific evidence. He dismisses fear of death as being present only with the living, the person about to die having made peace with himself.

Psychiatrist Aronson grapples with the treatment of the dying person and wants him to remain an individual human being until the last, even in the face of regression and dependence. He suggests four rules about informing patients of impending death: 1) Avoid precipitating psychopathology (depression or paranoid reactions); 2) Do not let hope die; 3) Do not minimize the gravity; and 4) Select the proper time for telling patients of impending death.

Psychiatrist Kasper discusses the psychodynamics of the physician's attitude toward death, including longitudinal factors involved in choice of occupation. Doctors are expected to be less fearful of death than others, and desensitization to the symbols of death is part of their training. However, when the only mention of feelings concerning death, taught in medical schools, is how to obtain permission for an autopsy, something is radically wrong. The dying patient does not feed the physician's narcissism and his feelings are therefore often neglected. Kasper's wise council encourages expression of grief and sympathy, because it makes the dying feel loved and that the living mourners will need his help and comfort. This is an excellent chapter with deep insights and useful applications.

Psychologists Alexander and Adlerstein report on an interesting experiment comparing religious and non-religious male college students in their attitudes and feelings about death. Their findings are characterized by an overall similarity between the two groups in their responses without reliable difference in anxiety levels and the same negative-toned affective concept for both groups.

Psychologists (and suicide experts) Shneidman and Farberow studied completed suicides by comparing them with controls consisting of attempt, thought and non-suicidal groups. Data analyzed were case histories, psychological tests and suicide notes, in an effort to develop understanding, predicting and preventing suicidal behavior. Sixty-two per cent of the suicides had histories of previous unsuccessful attempts. Half committed suicide within three months of leaving a hospital. Only 15 per cent left notes revealing destructive logic and semantic fallacies. Psychological tests thus far have not been specific or of predictive value. Menninger's triad (the wish to kill, the wish to be killed, and the wish to die) shows these trends: the first two decrease with age, whereas the last increases with age. This important research which already has developed useful hypotheses and findings warrants further interest and support.

Johns Hopkins Psychobiologist Richter describes and discusses the phenomenon of unexplained sudden death in rats and other animals, which he ascribes to excessive vagal stimulation and, to a lesser extent, to a sympathico-adrenal discharge. He also believes that the psychological state of hopelessness is an important factor. Interesting comments on Voodooism and sudden death in man lead to fascinating speculations concerning unexpected and unaccountable deaths in the medical literature.

Part V, a discussion chapter by Gardner Murphy of Topeka, summarizes each contribution exceedingly well and adds cogent thoughts and hypotheses which may well stimulate this type of research along thus far unexplored paths. This, in Feifel's words, "can enhance our understanding of the individual's behavior and yield an additional entryway to an analysis of cultures."

This book, well written and organized, should be read by all psychiatrists and other professional workers having contact with dying patients.

Werner Simon

BODENHEIMER, A. R. *Erlebnisgestaltung.* Benno Schwabe, Basel, Switzerland, 1957. 191 pp. $4.90

The author is a Swiss psychiatrist with many years of hospital experience. He describes a new technique of psychotherapy of psychoses. The treatment consists in the discussion and reliving of the psychotic episode under conditions that are carefully controlled by the therapist. Psychotherapy starts when the psychosis begins to fade, with the aim to establish an understanding of the meaning of the recent psychotic experience. The goal of the treatment is the prevention of a recurrence of the psychosis. The author believes that complete insight into the psychotic experience will shield the patient from a new attack.

The first part of the book deals with a thorough thoretical explanation of the rationale of the method. In the second part the author discusses some of the difficulties and dangers inherent in this treatment, together with its limitations. While brilliantly written, this book is not easy to read and the reviewer was unable to fully comprehend the scientific basis of this new therapeutic approach. This should not be held against the book, however, but might be due to a different concept of the etiology of episodic mental disorders on the part of the reviewer.

Irene L. Hitchman

KOREY, SAUL R., ED. *The Biology of Myelin.* Hoeber, New York, 1959. xxii + 405 pp., illus. $9.50

This volume is the fourth of the series on Progress in Neurobiology and is a series of papers with resulting discussion which constituted a symposium held several years ago. In all, twenty papers were presented which dealt with the microscopic structure of myelin, its development, chemistry, and physiologic properties. Electron microscopic studies relative to the structure and development of myelin were presented and similar techniques were applied to the process of degeneration and regeneration of peripheral nerves, as well as experimental allergic encephalomyelitis. Papers on the metabolism of glial and neurolemma cells are also presented. Genetic factors affecting myelinization are also included.

Although much of the material offered in this symposium has appeared elsewhere, it is pleasant to find it all under one cover. A particularly comprehensive chapter on experimental allergic encephalomyelitis constitutes the last chapter in the volume.

The well illustrated book will be of interest to anyone who is interested in the nervous system clinically, as well as those whose research activities involve a consideration of the role of the myelin sheath in the nervous system. The reader is at once struck by the great progress made recently in understanding of myelin, as well as the obvious missing links in the story of myelin.

GORDON, BENJAMIN LEE. *Medieval and Renaissance Medicine.* Philosophical Library, New York, 1959. xii + 843 pp., illus. $10.00

Having previously dealt with ancient medicine, Dr. Gordon now sets out to cover the history of medicine from Early Medieval times through the Renaissance. During this span of about a thousand years, a large number of writings dealing with or related to medicine were produced. Moreover, there exists a respectable body of modern historical literature on this period. The vastness of the research required may be responsible for the lack of a good book on the history of medieval medicine. Unfortunately, the present work does not fill the gap. Its author has approached his task with obvious enthusiasm, but has tried to circumvent the inherent difficulties largely by ignoring them. As a consequence, the book is full of errors as to facts (beginning with the spurious name of "Claudius" Galen and ending with misspelled titles in the footnotes to the last

chapter). More important perhaps, the book tends to substitute facile explanations for an investigation of underlying conditions and to deviate into subjects that are not pertinent to the theme.

The chapters dealing with psychiatric matters illustrate these points. The mentality of medieval man, especially in its abnormal aspects, certainly deserves study. But here, on thirty-five pages (pp. 545–579), we are given a presentation which lacks scope and accuracy. Without any evidence we are told that the people turned to superstitions because they "lost faith in physical remedies which brought them no relief." The mentioning of epidemics of "monomania" gives the author an opportunity to expound the Freudian theories about complexes, repressions, and actions of "the subconscious." Too much space in these thirty-five pages is devoted to authors who preceded the Middle Ages, and the last section deals with the crusades—a cultural and political phenomenon rather than a medical one.

Books like the present volume have the unfortunate tendency of not only misinforming their readers as to the Middle Ages, but as to the nature and task of medical history as well.

Owsei Temkin

ELIASBERG, WLADIMIR G. *Psychotherapy and Society* (Psychotherapy for the Many and the Few). Philosophical Library, New York, 1959. xviii + 233 pp. $6.00

Application of psychiatric knowledge, and especially the knowledge of unconscious mental processes, outside the field of individual therapy, is a widespread concern of our time. Few areas of human experience have not been subjected to scrutiny ultimately based on psychoanalysis, and some of these investigations have been enlightening. Two such applications of especial appropriateness are group therapy, and what might be called the treatment of society. As far as it is possible to make out Dr. Eliasberg's intentions, this is the subject of his book. From a point of view which is drawn from psychoanalysis, general psychiatry, existentialism, sociology, several philosophical systems, and his own ubiquitous writings, Dr. Eliasberg comes to the aid of the masses of people to whom individual therapy is not available, for economic or other reasons. In addition he would draw on the same seemingly bottomless fund of information to counter the noxious influences in our society,—industrial, political and other. Psychotherapy is thus to be a kind of counter-intelligence and counter-propaganda, serving the best interests of the individual and the group.

But for any plan as to how these aims are to be effected, we have to look further. This book of Dr. Eliasberg might possibly be accounted for as a collection of assorted notes for a volume on social aspects of psychotherapy. It consists of elaborate and irrelevant schedules, catalogues, and propositions, impenetrable disquisitions, pointless case-histories and not very funny jokes,—all put down in exceedingly poor English, and adorned with howling misprints.

Stanley A. Leavy

PITTENGER, ROBERT E., HOCKETT, CHARLES F. AND DANEHY, JOHN J. *The First Five Minutes: A Sample of Microscopic Interview Analysis.* Paul Martineau, Ithaca, New York, 1960. ix + 264 pp. $6.50

It takes hours to read *The First Five Minutes*, but the student will find it rewarding in every way in which a highly technical, scientific book can be rewarding. It will open up new vistas for his imagination; and it will give him new techniques with which to re-examine his preconceptions. It will challenge him to explore the vistas, to apply the new techniques to his own field, and also to improve them. A short monograph which can do all of these things is a valuable contribution, whether or not every technical detail is flawless or every theoretical hypothesis valid.

With the realization that the doctor must look beneath the skin, medicine began to come of age. Freud brought the same realization to psychiatry, with his emphasis on the importance of a three-dimensional view of human behavior, a view that penetrates below the surface to include an understanding of preconscious and unconscious as well as conscious processing. Psychiatry was in this way enriched by psychoanalysis. Yet in spite of this gain, psychiatry remained one of the more naive of the natural sciences in medicine. Now, however, we are on the threshold of its second period of growth, as new technical devices enable us to re-examine Freud's discoveries, *e.g.* by subjecting to systematic investigation the processes of free association, subliminal activities of all kinds, and the phenomena of communication.

The communications engineer studies simultaneously the communication within a machine from one stage of processing to the next, the communication of a problem (a "program") to the machine, and the answer which it in turn communicates at the output. Thus, the electronic computer constitutes a bridge from the human thinking machine to communications engineering. In turn, this builds a bridge between psychoanalytic psychiatry and information theory, linguistics and paralinguistics. This monograph constitutes a microscopic study of the processes of communication: since the intrapsychic process of one human being can be studied by another only insofar as they can be communicated. All of these are represented in this monograph. No such studies were possible until we had gadgets to record precisely what happens in any transaction between two human beings, the individual behavior of each, and that fragment of behavior which is communicated between them.

Investigations such as these require enormous patience. They are not spectacular to do, to record, to study or to publish. But to follow these studies is one of the more rewarding experiences for the serious student. Merely to repeat past studies with faintly shaded differences of meaning or emphasis or interpretation or with new descriptive metaphors does not advance the art or the science of human understanding. This advance will follow from the study of information, communication, linguistics, paralinguistics, and free association, if these are carried on by men who are matured and experienced in the techniques of the past. Our future growth demands such a union between the past and the future, of which this volume is an example.

That the work can also have immediate applicability is indicated in Chapter Six, where the authors discuss the practical applications of the development of an awareness of new types of signals.

Lawrence S. Kubie

JACO, E. GARTLEY, ED. *Patients, Physicians, and Illness.* Free Press, Glencoe, Illinois, 1958. vii + 600 pp. $7.50

The Editor has collected together in this large volume fifty-five separate articles, twenty of them original, which discuss medicine from a sociological point of view. Beginning with the premise that "the patient, the physician and illness itself may be given newer significance and understanding when examined from the perspective of the behavioral sciences," the editor has grouped the selected papers into categories relating first to the nature of illness, second to the characteristics of particular kinds of patients, third to the personality and training of the doctor, and last to the hospital and clinic. Within each category a wide range of subjects is covered. In the section titled Healing Practice and Practitioners, for instance, there are included papers dealing with the specialist and the general practitioner, malpractice risks, chiropractors, and alcoholism. The backgrounds of the sixty-three authors also are extremely varied with the fields of sociology, anthropology, social psychology, economics, and history being represented as well as those of medicine, psychiatry, and education. Ten of the authors are physicians.

As might be expected in a book containing so many articles on such a wide range of topics there is considerable variation in the amount of appeal to any particular individual from chapter to chapter. Some of the most interesting to physicians are those which explode some commonly held theories about the cause or effects of illness. Bernard J. Stern states on the basis of statistics gathered in various cities of the United States that "the basic factor to be considered in the genesis of rheumatic fever and rheumatic heart disease is poverty itself" and P. S. Lawrence indicates that rather than poor living conditions being the cause of chronic illness the converse is true. "Chronic disease is a more significant factor in causing reduced socio-economic status", he writes.

Some original and unusual correlations are made, such as that suggested by Stanley King and Daniel Funkenstein between religious habits of parents and the means used to express anger by their children. An interesting chapter by Lois Hoffman compares such things as father's occupation, medical school aptitude test scores and number of journals subscribed to with the quality of medical care given patients by eighty-eight general practitioners in North Carolina.

Other articles on folk healers, Christian Science and relations between religion and medicine are also worthwhile—written with humor and containing statistical information not easily available to the average physician. The style of writing is readable and non-technical. For those who are totally unfamiliar with the language of behavioral scientists there is a excellent glossary at the end of the book.

This volume could serve as a good reference work—a source book of facts and figures about illness, but it is more than that. It is also valuable and entertaining reading for anyone interested in gaining a broad perspective on medicine. Physicians tend to concern themselves too much with their own specialty and their own circle of patients. An over-view like this is impressive as well as humbling. This book presents us with many facts and figures but at the same time is well larded with theory and speculation. It stimulates the reader to wonder for himself in new ways and in new terms about the impact of illness upon the individual and the effectiveness with which doctor, hospital and clinic are fulfilling their responsibilities toward both patient and illness.

Graham B. Blaine, Jr.

HALL, BERNARD H., ED. *A Psychiatrist's World* (Selected Papers of Karl Menninger). Viking, New York, 1959. xxvi + 931 pp. $10.00

This unique collection of writings is a multifaceted mirror of Doctor Karl Menninger's interests and activities through forty years of his professional career. From the great wealth of his published papers more than eighty of his writings have been selected by a committee of his medical colleagues in commemoration of his sixty-fifth birthday. Doctor Bernard Hall, who served as the Editor, presents vivid commentaries on each of the six parts of sections into which this book is divided. These divisions mirror Doctor Menninger in his activities as a physician, as an investigator, as a psychiatrist, as a psychoanalyst, as a teacher, as a writer, as an administrator and as a theorist. Both the editor and the committee which selected Doctor Menninger's papers for this volume have successfully achieved a presentation reminding the reader of a "This is Your Life" of this great leader in American Psychiatry. Doctor Menninger has the unusual literary talent for conveying his knowledge in a manner understandable to professionally trained as well as lay readers.

A Psychiatrist's World documents the development of dynamic psychiatry and the contributions of psychiatry to other disciplines. It is a convincing demonstration of the fact that psychiatry, as a basic science, obliterates the barriers between other disci-

plines involved in human relations and that the significance of this is beginning to emerge and may eventually influence the professions to a more adequate understanding of mankind.

Leo H. Bartemeier

GARNER, ANN M. AND WENAR, CHARLES, WITH JENNIE B. KAHN AND JEAN P. CHAPMAN. *The Mother-Child Interaction in Psychosomatic Disorders.* University of Illinois Press, Urbana, 1959. viii + 290 pp. $6.00

This is a scholarly and readable book which reports an interesting, generally well-conceived and executed research project concerning one set of factors in the etiology of psychosomatic disorders in children. In former years such a report would likely have appeared as a monograph, filled with numerical tables and bad writing. It is a pleasure to report that these authors have been able to combine a clear, lively narrative style with careful use of appropriate technical terminology. Though the topic of the book is a complex and difficult one, the authors for the most part neither oversimplify nor overcomplicate their discussion. Or perhaps one should better say that where simplifications do occur to add saliency to the exposition, the authors are well aware of them.

The study itself was based on the central hypothesis ". . . that susceptibility to psychosomatic illness in children develops in the first year of life, when response patterns are laid down . . ." and was specifically designed to test the hypothesis that ". . . early susceptibility to psychosomatic illness flourishes within a field of a particular sort of mother-infant interaction, where the mother is lacking in what we here call 'motherliness' " (p. 11). The authors broadly define motherliness as "maternal gratification of the infant's needs for body care and pleasurable stimulation in ways that also provide the mother herself with satisfaction" (p. 15). Twenty-six mother-child pairs in each of three groups were studied in a variety of ways: 1) A psychosomatic group composed of children with asthma, rheumatoid arthritis, ulcerative colitis, eczema or ulcer; 2) A neurotic group, characterized largely by anxiety, aggressivity or delinquency plus a few children who were withdrawn or showed sexual problems; 3) A chronic illness group composed of children with a variety of non-psychosomatic illnesses, selected without reference to the emotional status of the child. This third group included children with congenital cardiac malformations, polio residuals, nephrosis and a variety of other chronically handicapping physical disorders. The children were of both sexes, IQ range 85–137, white-Negro ratio about 5:1, about equally of middle and low socioeconomic status and ranged in age from six to eleven and a half years. Most lived in intact homes and had one or more siblings.

Though there is not space here to discuss in detail the procedures employed, some indication of the variety of methods may be useful. These included individual "semi-structured" tape-recorded interviews with the mothers, a special 20-card set of picture-story stimuli covering pregnancy, mother-infant care situations, and other parent-child interactions; observation of a brief mother-child playroom session; an orally administered questionnaire administered to the child and then to the mother, who was asked to "answer them the way you think your child did." The mother interviews emphasized the details and quality of baby-care activities during the infants' first year, though they were not restricted to this area. In addition the children performed drawings, a brief intelligence test, told stories to pictures suggesting various "mothering" situations, played with and indicated their preferences for toys with a variety of sensory qualities. They also were given the Rorschach, the World Test and the Garner Illness Fantasy Test, designed to elicit the child's notions regarding the cause and nature of illness.

Data from this impressive number of procedures were organized by means of many ingenious, carefully developed rating scales and judgmental approaches, with attention to clear definition of the rating dimensions, interjudge reliability and so on.

One cannot do justice in a brief review to the fully recorded findings and many careful, detailed comparisons which emerged from the study. Suffice it to say that the results did give considerable support to the major hypothesis. In their first year of life children who later developed psychosomatic disorders did appear to have experienced the type of inadequate mothering hypothesized. There appeared to have been a lack of maternal gratification in care-taking activities, relatively little spontaneous pleasure and pride by the mother in her baby, and a relationship simultaneously close in its entanglement or mutual frustration and lacking in "harmonious interplay of maternal tenderness and infant pleasure." The authors comment, "The hypothesized effects upon the infant are twofold. At the somatic level, he does not receive the type of continuous protection from distress which is so important to the achievement of physiological integration. This serves to perpetuate a pattern of diffuse, extreme and erratic response to stress. The second consequence is that, in the infant's first dim awareness of his interpersonal environment, intimacy is closely associated with distress" (p. 161). As compared with the mothers of the other two groups of children, the mothers of psychosomatic children gave evidence of having had, during their pregnancies, happier, even overidealized anticipations concerning their expected babies. The authors believe that these anticipations represent "an overinvestment in specific goals ulterior to those of giving and receiving gratification from the infant" (p. 160). Once arrived on the scene, the real baby proved unable to fulfill the unrealistic, wishful needs, which continued to exist and to maintain the mother in a continuing frustrating involvedness with her infant. Though the mothers of neurotic children appeared to have had at least as much total quantity of negative feelings toward their infants, they were in general more free in the expression of all feelings, both positive and negative and had their moments of pleasure, affection and pride in the infant. There was not "that wariness, that noncommittal quality which characterizes the Psychosomatic mother in spite of her continual closeness" (p. 165).

It might be inferred that the authors are, in effect, proposing a concept similar to that of the schizophrenogenic mother—a psychosomatogenic mother. Unless I have overlooked it, the authors use no such term; and they are far too sophisticated to propose anything but a multiple and complex causality for any human condition. They introduce their topic by saying (p. 10) ". . . psychosomatic disorder is a complex maladaptive pattern, involving both organ vulnerability and special difficulties in the interpersonal field." Nevertheless, though the authors have a perfect right to focus on one set of determinants, the reader may find himself wondering about the question of constitutional susceptibility to somatic disorder. The studies of Escalona, Lourie and others have demonstrated that infants vary at birth in reactive sensitivity to certain types of stimuli. It seems reasonable to consider that infants may likewise be constitutionally under- or over-reactive in those organ systems involved in psychosomatic disorders, such as those in this study. Suppose that one began by studying mothers. How many with characteristics like the "psychosomatogenic" mothers of this study would in fact turn out to have psychosomatic children? Presumably not all. How many women like the mothers of the neurotic children would turn out also to have, not neurotic, but psychosomatic children instead? Presumably some. It is no real criticism of the present research to raise these questions, which undoubtedly have occurred to the authors as well. To answer

them, one must either assume equality of constitutional predisposition (obviously untenable) and look entirely to further psychological descriptions, or assume constitutional variance and explore this with appropriate methodology. To understand organ vulnerability will require many independent and collaborative studies by biochemists, geneticists, obstetricians, pediatricians, psychiatrists and psychologists. That's a lot of disciplines (and people) and the difficulties are obvious.

This study was, in large sense, retrospective. As such, one may share the authors' expressed misgivings about the reliability and accuracy of memory and reports of earlier life events, and of the correspondence between current and prior relationships and attitudes. The use of the two control groups and of independent judges' evaluations adds considerably, of course, to one's confidence in the findings. But the method leaves unexplored the possibility that these groups of mothers may have differed in accuracy of recall or report in ways related to the issue (!) under consideration. The alternatives to retrospection are formidable indeed. The longitudinal study of a population large enough to include the later appearance of any substantial number of psychosomatic and chronically ill children is awesome to contemplate. The clarification of unconscious distortions, through psychoanalysis, would also be a monumental task. Furthermore, the latter also partakes of the retrospective approach and includes the possibility (denied by some) of replacing old distortions with new ones. In view of these considerations, one may conclude that the authors made the only practical choice open to them.

This review has emphasized the authors' findings concerning the mothers to the neglect of those regarding the children themselves. Though less directly relevant to the major hypothesis, the child data are also extremely interesting, especially the between-group differences in fantasies and explanations of the causes of illness. The psychosomatic children gave more "interpersonal" explanations for illness ("because he got mad at his mother"), the neurotic children emphasized contagion, and those with non-psychosomatic illness more often attributed illness to God. Furthermore, the psychosomatic children more often indicated that merely *feeling* some negative emotion (anger, fright, guilt), as contrasted with the outward expression (yelling aloud, taking money wrongly), was responsible for illness. For further descriptions of the children's characteristics, the reader must consult the report itself.

In closing this review I should like to comment on two excellent additional features. In a chapter entitled "Evaluation of Design," the authors both defend and criticize their approaches to the problem. They are frank and disarming in pointing up the problems which their methodology involved and the difficulties in evaluating results from their use of some new and relatively untried techniques. The second feature consists of a number of chapters explaining in great detail the specific data collection, scoring and evaluative procedures. This feature is common enough in doctoral dissertations (though seldom so well done) but is all too often given scanty space in other research publications. The clarity and completeness of methodological description are both an invitation and a guide for others to replicate or extend the work which the authors and their collaborators have begun so well.

Ralph L. Dunlap